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(57) Abstract

A method for killing pests (e.g. insects) comprising administering material from Xenorhabdus species (e.g. X. nematophilus) such as cells or supernatants orally to the pests, either alone or in conjunction with Bacillus thuringiensis or pesticidal materials derived therefrom. Also disclosed is an isolated pesticidal agent (and compositions comprising the same) characterised in that it is obtainable from cultures of X. nematophilus or mutants thereof, has oral pesticidal activity against Pieris brassicae, Pieris rapae and Plutella xylostella, is substantially heat stable to 55 °C, is proteinaceous, acts synergistically with B. thuringiensis cells as an oral pesticide and is substantially resistant to proteolysis by trypsin and proteinase K. DNA encoding pesticidal activity is also disclosed.

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PESTICIDAL AGENTS

The present invention relates to materials, agents and compositions having pesticidal activity which derive from bacteria, and more particularly from Xenorhabdus species. The invention further relates to organisms and methods employing such compounds and compositions.

There is an ongoing requirement for materials, agents, compositions and organisms having pesticidal activity, for instance for use in crop protection or insectmediated disease control. Novel materials are required to overcome the problem of resistence to existing pesticides. Ideally such materials are cheap to produce, stable, have a high toxicity (either when used alone or in combination) and are effective when taken orally by the pest target. Thus any invention which provided materials, agents, compositions or organisms in which any of these properties was enhanced would represent a step forward in the art.

Xenorhabdus spp. in nature are frequently symbiotically associated with a nematode host, and it is known that this association may be used to control pest activity. For instance, it is known that certain Xenorhabdus spp. alone are capable of killing an insect host when injected into the host's hemocoel.

In addition, one extracellular insecticidal toxin from Photorhabdus luminescens has been isolated (this species was recently removed from the genus Xenorhabdus, and is closely related to the species therein). This toxin is not effective when ingested, but is highly toxic when injected into certain insect larvae (see Parasites and Pathogens of Insects Vol.2, Eds. Beckage, N. E. et al., Academic Press 1993).

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Also known are certain low-molecular weight heterocyclic compounds from *P.luminescens* and *X.nematophilus* which have antibiotic properties when applied intravenously or topically (see Rhodes, S.H. et al., PCT WO 84/01775).

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Unfortunately none of these prior art materials have the ideal pesticide characteristics discussed above, and in particular, they do not have toxic activity when administered orally.

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The present invention provides pesticidal agents and compositions from *Xenorhabdus* species, organisms which produce such compounds and compositions, and methods which employ these agents, compositions and organisms, that alleviate some of the problems with the prior art.

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According to one aspect of the present invention there is disclosed a method of killing or controlling insect pests comprising administering cells from *Xenorhabdus* species or pesticidal materials derived or obtainable therefrom, orally to the pests.

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A PCT application of CSIRO published as WO 95/00647 discloses an apparently toxic protein from Xenorhabdus nematophilus; however no details of the protein's toxicity are given, and certainly there is no disclosure of its use as an oral insecticide.

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Thus the invention provides an insecticidal composition adapted for oral administration to an insect, which composition comprises a pesticidal material obtainable from a Xenorhabdus species, or a pesticidal fragment thereof, or a pesticidal variant or derivative of either of these.

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The composition may in fact comprise cells of Xenorhabdus or alternatively supernatant taken from cultur s of cells of Xenorhabdus species. However, the composition

preferably comprises toxins isolable from Xenorhabdus as illustrated her inafter. Toxic activity has be n associated with material encoded by the nucleotide sequ nce of Figure 2. Thus, the composition suitably comprises a pesticidal material which is encoded by all or part of the nucleotide sequence of Figure 2. Pesticidal fragments as well as variants or derivatives of such toxins may also be employed.

The sequence of Figure 2 is of the order of 40kb in length. It is believed that this sequence may encode more than one protein, each of which may regulate or be insecticidal either alone or when presented together. It is a matter of routine to determine which parts are necessary or sufficient for insecticidal activity.

As used herein the term 'variant' refers to toxins which have modified amino acid sequence but which share similar activity. Certain amino acids may be replaced with different amino acids without altering the nature of the activity in a significant way. The replacement may be by way of 'conservative substitution' where an amino acid is replaced with an amino acid of broadly similar properties, or there may be some non-conservative substitutions. In general however, the variants will be at least 60% homologous to the native toxin, suitably at least 70% homologous and more preferably at least 90% homologous.

The term `derivative' relates to toxins which have been modified for example by chemical or biological methods.

These toxins are novel, and they and the nucleic acids which encode them form a further aspect of the invention.

A preferred Xenorhabdus species is the bacteria

X.nematophilus. Particular strains of X.nematophilus

which are us ful in the context of the inv ntion are

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ATTC 19061 strain, available from the National Collection of Industrial and Marine Bacteria, Aberdeen, Scotland (NCIMB). In addition, suitable strains include two novel strains of Xenorhabdus which were deposited at the NCIMB on 10 July 1997 and were designated with repository numbers NCIMB 40886 and NCIMB 40887. These latter strains form a further aspect of the invention.

All strains have common characteristics as set out in the following Table 1.

Table 1 Strains

Characteristics	ATCC 19061	NCIMB 40887	NCIMB 40886
Gram strain	negative	negative	negative
Shape/size	rods up to	rods up to	rods up to
	4µm long	4µm long	4μm long
Motile	Y e s	Yes	Yes
Bioluminescent	No	No	No
Colour on NBTA*	blue	blue	blue
insecticidal on			
ingestion by	yes	yes	yes
insects			
Production of	yes	yes	yes
Antibiotics			
Resistant to			
ampicillin	yes	yes	yes
(50µg/ml)			
colony	circular	circular	circular
morphology/	convex	convex	convex
colour	cream	cream	cream

15 *NBTA (Oxoid nutrient agar containing 0.0025% bromothymol blue and 0.004% tetrazolium chloride)

Preferably the pest target is an insect, and more preferably it is of the order Lepidoptera, particularly

Pieris brassicae, Pieris rapae, or Plutella xylostella or the order Diptera, particularly Culex quinquefaciatus.

In a preferred embodiment of the invention, cells from Xenorhabdus species or agents derived therefrom are used in conjunction with Bacillus thuringiensis as an oral pesticide.

In further embodiments, rather than using Bacillus
thuringiensis itself, pesticidal materials obtainable
from B.thuringiensis (e.g. delta endotoxins or other
isolates) are used in conjunction with Xenorhabdus
species.

- The term 'obtainable from' is intended to embrace not only materials which have been isolated directly from the bacterium in question, but also those which have been subsequently cloned into and produced by other organisms.
- Thus the unexpected discovery that bacteria of the genus Xenorhabdus (and materials derived therefrom) have pesticidal activity when ingested, and that such bacteria and materials can be used advantageously in conjunction with B.thuringiensis (and toxins or materials derived
- 25 therefrom), forms the basis of a further aspect of the present invention. The pesticidal activity of B.thuringiensis isolates alone have been well documented. However, synergistic pesticidal activity between such isolates and bacteria of the Xenorhabdus species (or
- 30 materials derived therefrom) has not previously been demonstrated.

In still further embodiments of the invention, culture supernatant taken from cultures of Xenorhabdus species, particularly X. nematophilus, is used in place of cells from Xenorhabdus species in the methods above.

All of these methods can be employed, <u>inter alia</u>, in pest control.

The invention also makes available pesticidal

compositions comprising cells from Xenorhabdus species,
preferably X.nematophilus, in combination with B.
thuringiensis. As with the methods above, a pesticidal
toxin from B.thuringiensis (preferably a delta endotoxin)
may be used as an alternative to B.thuringiensis in the
compositions of the present invention

Likewise, culture supernatant taken from cultures of Xenorhabdus species, preferably, X.nematophilus may be used in place of cells from Xenorhabdus species.

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Such compositions can be employed, inter alia, for crop protection eg. by spraying crops, or for livestock protection. In addition, compositions of the invention may be used in vector control.

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The invention further encompasses novel pesticidal agents which can be isolated from *Xenorhabdus spp*. Techniques for isolating such agents would be understood by the skilled person.

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In particular, such techniques include the separation and identification of toxin proteins either at the protein level or at the DNA level.

The applicants have cloned and partially sequenced a region of DNA from Xenorhabdus NCIMB 40887 which region codes for insecticidal activity and this is shown as Figure 2 (SEQ ID NO. 1) hereinafter. Thus in a preferred embodiment the invention also provides a toxin which is encoded by DNA of SEQ ID No. 1 or a variant or fragment thereof.

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The invention also provides a recombinant DNA which encodes such a toxin. The recombinant DNA of the invention may comprise the sequence of Figure 2 or a variant or fragment thereof. Other DNA sequences may encode similar proteins as a result of the degeneracy of the genetic code. All such sequences are encompassed by the invention.

The sequence provided herein is sufficient to allow probes to be produced which can be used to identify and subsequently to extract DNA of toxin genes. This DNA may then be cloned into vectors and host cells as is understood in the art.

DNA which comprises or hybridises with the sequence of Figure 2 under stringent conditions forms a further aspect of the invention.

The expression `hybridises with' means that the

nucleotide sequence will anneal to all or part of the
sequence of Figure 2 under stringent hybridisation
conditions, for example those illustrated in `Molecular
Cloning', A Laboratory Manual' by Sambrook, Fritsch and
Maniatis, Cold Spring Habor Laboratory Press, Cold Spring
Harbor, N.Y.

The length of the sequence used in any particular analytical technique will depend upon the nature of the technique, the degree of complementarity of the sequence, the nature of the sequence and particularly the GC content of the probe or primer and the particular hybridisation conditions employed. Under high stringency, only sequences which are completely complementary will bind but under low stringency conditions, sequences which are 60% homologous to the target sequence, more suitably 80% homologous, will bind. Both high and low stringency conditions are encompassed by the term "stringent conditions" used herein.

Suitable fragments of the DNA of Figure 2, i.e. those which encode pesticidal agents may be identified using standard techniques. For example, transposon

5 mutagenesis techniques may be used, for example as described by H.S. Siefert et al., Proc. Natl. Acad. Sci. USA, (1986) 83, 735-739. Vectors such as the cosmid cHRIMI, can be mutated using a variety of transposons and then screened for loss of insectidal activity. In this way regions of DNA encoding proteins responsible for toxic activity can be identified.

For example, the mini-transposon mTn3(HIS3) can be introduced into a toxic Xenorhabdus clone such as cHRIM1, 15 hereinafter referred to as `clone 1', by electroporating cHRIM1 DNA into E.coli RDP146(pLB101) and mating this strain with E.coli RDP146(pOX38), followed by E. coli NS2114Sm. The final strain will contain cHRIM1DNA with a single insertion of the transposon mTn3(HIS3). 20 colonies can be cultured and tested for insecticidal activity as described in Example 8 hereinafter. Restriction mapping or DNA sequencing can be used to identify the insertion point of mTn3(HIS3) and hence the regions of DNA involved in toxicity. Similar approached 25 can be used with other transposons such as Tn5 and mTn5.

Site directed mutagenesis of cHRIM1 as outlined in "Molecular Cloning, A Laboratory Manual" by Maniatis, Fritsch and Sambrook, (1982) Cold Spring Harbor, can also be used to test the importance of specific regions of DNA for toxic activity.

Alternatively, subcloning techniques can be used to identify regions of the cloned DNA which code for insecticidal activity. In this method, specific smaller fragments of the DNA are subcloned and the activity determin d. To do this, cosmid DNA can be cut with a suitable restriction enzyme and ligated into a compatible

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restriction site on a plasmid vector, such as pUC19. The ligation mix can be transformed into *E. coli* and transformed clones selected using a selection marker such as antibiotic resistance, which is coded for on the plasmid vector. Details of these techniques are described for example in Maniatis et al, supra, (see p390-391) and Methods in Molecular Biology, by L.G. Davies, M.D. Dibner and J.F. Battey, Elsevier, (see p222-224).

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Individual colonies containing specific cloned fragments can be cultured and tested for activity as described in Example 8 hereinafter. Subclones with insecticidal activity can be further truncated using the same methodology to further identify regions of the DNA coding for activity.

The invention also discloses an isolated pesticidal agent characterised in that the agent is obtainable from cultures of X. nematophilus or variants thereof, has oral pesticidal activity against Pieris brassicae, Pieris rapae and Plutella xylostella, is substantially heat stable to 55°C, is proteinaceous, acts synergistically with B.thuringiensis cells as an oral pesticide and is substantially resistant to proteolysis by trypsin and proteinase K.

By 'substantially heat stable to 55°C' is meant that the agent retains some pesticidal activity when tested after heating the agent in suspension to 55°C for 10 minutes, and preferably retains at least 50% of the untreated activity.

By 'substantially resistant to proteolysis' is meant that the agent retains some pesticidal activity when exposed to proteases at 30°C for 2 hours and preferably retains at least 50% of the untreated activity.

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By 'acts synergistically' is meant that the activity of the combination of components is greater than one might expect from the use of the components individually. For example, when used in conjunction with B. thuringiensis cells as an oral pesticide, the concentration of B. thuringiensis cellular material necessary to give 50% mortality in a P.brassicae when used alone is reduced by at least 80% when it is used in combination the agent at a concentration sufficient to give 25% mortality when the agent is used alone.

It has been found that the activity of the material is retained by 30 kDa cut-off filters but is only partly retained by 100 kDa filters.

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Preferably the agent is still further characterised in that the pesticidal activity is lost through treatment at 25°C with sodium dodecyl sulphate (SDS - 0.1% 60 mins) and acetone (50%, 60 mins).

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Clearly the characterising properties of the isolated agent described above can be utilised to purify it from, or enrich its concentration in, Xenorhabdus species cells and culture medium supernatants. Methods of purifying proteins from heterogenous mixtures are well known in the art (eg. ammonium sulphate precipitation, proteolysis, ultrafiltration with known molecular weight cut-off filters, ion-exchange chromatography, gel filtration, etc.). The oral pesticidal activity provides a convenient method of assaying the level of agent after each stage, or in each sample of eluent. Such methodology does not require inventive endeavour by those skilled in the art.

The invention further discloses oral pesticidal compositions comprising one or more agents as described above. Such compositions preferably further comprise other pesticidal materials from non-Xenorhabdus species.

These other materials may be chosen such as to have complementary properties to the agents described abov , or act synergistically with it.

- 5 Preferably the oral pesticidal composition comprises one or more pesticidal agents as described above in combination with B. thuringiensis (or with a toxin derived therefrom, preferably endotoxin).
- Recombinant DNA encoding said proteins also forms a further aspect of the invention. The DNA may be incorporated into an expression vector under the influence of suitable control elements such as promoters, enhancers, signal sequences etc. as is understood in the art. These expression vectors form a further aspect of the invention. They may be used to transform a host organism so as to ensure that the organism produces the toxin.
- The invention further makes available a host organism comprising a nucleotide sequence coding for a pesticial agent as described above.
- Methods of cloning the sequence for a characterised 25 protein into a host organism are well known in the art. For instance the protein may be purified and sequenced: as activity is not required for sequencing, SDS gel electrophoresis followed by blotting of the gel may be used to purify the protein. The protein sequence can be 30 used to generate a nucleotide probe which can itself be used to identify suitable genomic fragments from a Xenorhabdus gene library. These fragments can then be inserted via a suitable vector into a host organism which can express the protein. The use of such general 35 methodology is routine and non-inventive to those skilled in the art. Such techniques may be applied to the production of X norhabdus toxins other than those encoded

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by the sequence of Figure 2.

It may be desirable to manipulate (eg. mutate) the agent by altering its gene sequence (and hence protein structure) such as to optimise its physical or toxicological properties.

It may also be desirable for the host to be engineered or selected such that it also expresses other proteinaceous pesticidal materials (eg. delta- endotoxin from B.

- thuringiensis). Equally it may be desirable to generate host organisms which express fusion proteins composed of the active portion of the agent plus these other toxicity enhancing materials.
- 15 A host may be selected for the purposes of generating large quantities of pesticidal materials for purification e.g. by using B.thuringiensis transformed with the agent-coding gene. Preferably however the host is a plant, which would thereby gain improved pest-resistance.
- 20 Suitable plant vectors, eg. the Ti plasmid from Agrobacterium tumefaciens, are well known in the art.

 Alternatively the host may be selected such as to be directly pathogenic to pests, eg. an insect baculovirus.
- The teaching and scope of the present invention embraces all of these host organisms plus the agents, mutated agents or agent-fusion materials which they express.
- Thus the invention makes available methods, compositions, agents and organisms having industrially applicable pesticidal activity, being particularly suited to improved crop protection or insect-mediated disease control.
- 35 The methods, compositions and agents of the present invention will now be described, by way of illustration only, through reference to the following non-limiting examples and figures. Other embodiments falling within

the scope of the invention will occur to those skilled in the art in the light of these.

FIGURE

- Figure 1 shows the variation with time of the growth of X. nematophilus ATCC 19061 and activity of cells and supernatants against P. brassicae as described in Example 3.
- 10 Figure 2 shows the sequence of a major part of a cloned toxin gene from Xenorhabdus.

Figure 3 shows a comparison of the restriction maps of cloned toxin genes from two strains of *Xenorhabdus*15 (clone 1 above and clone 3 below).

EXAMPLES

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Example 1 - Use of X. nematophilus cells as an oral insecticide

CELL GROWTH: A subculture of X.nematophilus (ATCC 19061, Strain 9965 available from the National Collections of Industrial and Marine Bacteria, Aberdeen, Scotland) was used to inoculate 250 ml Erlenmeyer flasks each containing 50 ml of Luria Broth containing 10g tryptone, 5g yeast extract and 5g NaCl per litre. Cultures were grown in the flasks at 27°C for 40hrs on a rotary shaker.

PRODUCTION OF CELL SUSPENSION: Cultures were centrifuged at 5000 x g for 10 mins. The supernatants were discarded and the cell pellets washed once and resuspended in an equal volume of phosphate buffered saline (8g NaCl, 1.44g Na_2HPO_4 and 0.24g of KH_2PO_4 per litre) at pH 7.4.

ACTIVITY OF CELL SUSPENSION TO INSECTS: The bioassays were as follows: P. brassicae: The larvae were allowed to feed on an artificial agar-based diet (as described by David and Gardiner (1965) London Nature, 207, 882-883) into which a series of dilutions of cell suspension had been incorporated. The bioassays were performed using a series of 5 doses with a minimum of 25 larvae per dose. Untreated and heat-treated (55°C for 10 minutes) cells were tested. Mortality was recorded after 2 and 4 days with the temperature maintained at 25°C.

		LC50 cells/g diet			
	Treatment	2 days	4 days		
	Untreated	5.9×10^5	9.8×10^4		
15	Treated 55°C	7.1×10^5	1.4×10^5		

Aedes aegypti: The larva were exposed to a series of 5 different dilutions of cell suspension in deionised water. The biosassays were performed using 2 doses per dilution of 50 ml cell suspension in 9.5cm plastic cups with 25 second instar larvae per dose. Untreated and heat-treated (55°C or 80°C for 10 minutes) cells were tested. Mortality was recorded after 2 days with the temperature maintained at 25°C.

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	LC50 cells/ml
Treatment	2 days
Untreated	5.1 x 10 ⁶
Treated 55°C	7.4 x 10 ⁶
Treated 80°C	> 10 ⁸

<u>Culex quinquefaciatus</u>: The larvae were exposed to a single concentration cell suspension containing 4 x10⁷ cells/ml. The biosassays were performed using 2 50 ml cell suspensions in 9.5 cm plastic cups with 25 second instar larvae per cup. Untreated and heat-treated (55°C or 80°C for 10 minutes) cells were tested. Mortality was

recorded after 2 days with the temperature maintained at 25°C.

		% Mortality
5	Treatment	2 days
	Untreated	100
	Treated 55°C	100
	Treated 80°C	0

10 Thus these results clearly show that cells from X.

nematophilus are effective as an oral insecticide against
a number of insect species (and are particularly potent
against P.brassicae). The insecticidal activity is not
dependent on cell viability (i.e is largely unaffected by
15 heating to 55°C which reduces cell viability by >99.99%)
but is much reduced by heating to 80°C, which denatures
most proteins.

Example 2 - Use of X.nematophilus supernatant as an oral insecticide

CELL GROWTH: Cultures were grown as in Example 1.

PRODUCTION OF SUPERNATANT: Cultures were centrifuged
twice at 10000g for 10 mins. The cell pellets were
discarded.

ACTIVITY OF SUPERNATANT TO INSECTS: The Bioassay was as follows:

Activity against neonate P. brassicae and two day old Pieris rapae and Plutella xylostella larvae was measured as for P. brassicae in Example 1, but using a series of untreated dilutions of supernatant in place of of cell supensions and with mortality being recorded after 4 days

35 only.

LC50 (µl supernatant/g diet) 4 days

Insect species 22 P. brassicae 79 P. rapae P. xylostella 135

In addition, size-reducing activity (62% reduction in 7 days) against Mamestra brassicae was detected in larvae fed on an artificial diet containing X. nematophilus 10 supernatant (results not shown).

Thus these results clearly show that the supernatant from X. nematophilus culture medium is effective as an oral insecticide against a number of insect species, and are 15 particularly potent against P. brassicae.

The heating of supernatants to 55°C for 10 minutes caused a partial loss of activity while 80°C caused complete loss of activity. Activity was also completely lost by treatment with SDS (0.1%w/v for 60 mins) and Acetone (50% v/v for 60 mins) but was unaffected by Triton X-100 (0.1% 60 mins), non-diet P40 (0.1% 60 mins), NaCl (1 M for 60 mins) or cold storage at 4°C or -20°C for 2 weeks. All of these properties are consistent with a proteinaceous 25 agent.

The general mode of action of X. nematophilus cells and supernatants i.e. reduction in larval size and death within 2 days at high dosages, and other properties, eg. temperature resistence, appear to be similar suggesting a single agent or type of agent may be responsible for the oral insecticide activity activities of both cells and supernatants.

Example 3 - Timescale for appearance of ingestable ins cticidal activity

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CELL GROWTH: 1ml of an overnight culture of X.

nematophilus was used to inoculate an Erlenmeyer flask.

Cells were then cultured as in Example 1. Growth was estimated by measuring the optical density at 600 nm.

PRODUCTION OF CELL SUSPENSION AND SUPERNATANTS: These were produced as in Examples 1 and 2.

ACTIVITY OF CELLS AND SUPERNATANTS AGAINST P. BRASSICAE:

The cell suspension bioassay was carried out as in Example 1, but using a single dose of suspended cells equivalent to 50 μ l of broth/g diet and measuring mortality after 2 days. The cell supernatant bioassay was carried out as in Example 2, but using a single dose equivalent to 50 μ l supernatant/g diet (i.e. more than twice the LC50) and measuring mortality after 2 days.

The results are shown in Fig. 1. Thus these results clearly show that cells taken from X. nematophilus culture medium are highly effective as an oral insecticide against P. brassicae after only 5 hours, and supernatants are highly effective after 20 hours. Although some slight cell lysis was observed in the early stages of growth, no significant cell lysis was observed after this point demonstrating that the supernatant activity may be due to an authentic extracellular agent (as opposed to one released only after cell breakdown).

Example 4 - Synergy between X. nematophilus cells and B.thuringiensis powder preparations

CELL GROWTH AND SUSPENSION: X. nematophilus cells were grown and suspended as in Example 1. B. thuringiensis strain HD1 (from Bacillus Genetic Stock Centre, The Ohio State University, Columbus, Ohio 43210, USA) was cultured, harvested and formulated into a powder as described by Dulmage et al.(1970) J. Invertebrate Pathology 15, 15-20.

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ACTIVITY OF X. NEMATOPHILUS CELLS AND B. THURINGIENSIS
POWDER AGAINST P. BRASSICAE: The bioassays was carried
out using X. nematophilus and B. thuringiensis in

5 combination or using B. thuringiensis cell powder alone.
Bioassays were carried out as in Example 1 but with
various dilutions of B. thuringiensis powder in place of
X. nematophilus. For the combination experiment, a
constant dose of X. nematophilus cell suspension
10 sufficient to give 25% mortaility was also added to the
diet. Mortality was recorded after 2 days.

		LC50 (μ g Bt powder/g diet	.)
	Bioassay	2 days	
15	B.t. alone	1.7	
	B.t. plus X.nematophilus	0.09	

These results clearly demonstrate the synergism between X. nematophilus cells and B. thuringiensis powder when acting as an oral insecticide against P. brassicae.

Example 5 - Synergy between of X.nematophilus supernatants and B. thuringiensis powder

- 25 CELL GROWTH AND PRODUCTION OF SUPERNATANTS: X.

 nematophilus cells were grown and supernatants prepared
 as in Example 2. B. thuringiensis was grown and treated
 as in Example 4.
- ACTIVITY OF X. NEMATOPHILUS SUPERNATANTS AND Bt CELL
 POWDER AGAINST P. BRASSICAE:
 The bioassays were carried out using X. nematophilus
 supernatants and B. thuringiensis in combination or using
 B. thuringiensis powder alone. The Bioassay against
 neonate P. brassicae and two day old Pieris rapae and
 Plutella xylost lla larvae w re measured as in Example 2
 but with various dilutions of B. thuringiensis in place
 of X. nematophilus. For the combination experiment, a

constant dose of X. nematophilus supernatant sufficient to give 25% mortality was also added to the diet.

Mortality was recorded after 4 days.

 LC_{50} (μ g Bt powder/g)

diet

5

	Insect species	Bt alone	Bt plus Xn
	P. brassicae	1.4	0.12
	P. rapae	2.5	0.26
10	P. xylostella	7.2	0.63

These results clearly demonstrate the synergism between X.nematophilus supernatants and B.thuringiensis powder when acting as an oral insecticide against several insect species. The fact that both X. nematophilus cells and supernatants demonstrate this synergism strongly suggests that a single agent or type of agent is responsible for the demonstrated activities.

20 Example 5 - Characterisation of insecticidal agent from X.nematophilus supernatant by proteolysis

CELL GROWTH AND PRODUCTION OF SUPERNATANTS: X.

nematophilus cells were grown and supernatants prepared

25 as in Example 2.

PROTEOLYSIS OF SUPERNATANT: Culture supernatant (50ml) was dialysed against 0.5 M NaCl (3 x 1 l) for 48 hours at 4°C. The volume of the supernatant in the dialysis tube was reduced five-fold by covering with polyethylene glycol 8000 (Sigma chemicals). Samples were removed and treated with either trypsin (Sigma T8253 = 10,000 units/mg) or proteinase K (Sigma P0390 = 10 units/mg) at a concentration of 0.1 mg protease/ml sample for 2 hours at 30°C.

ACTIVITY OF PROTEASE TREATED SUPERNATANT AGAINST P. BRASSICAE: The boassay against neonate P. brassicae

larvae was carried out by spreading 25 μ l of each 'treatment' on the artificial agar-based diet referred to in Example 1 in a 4.5 cm diameter plastic pot. Four pots each containing 10 larvae were used for each treatment.

Mortalities were recorded after 1 and 2 days. Controls using water only, trypsin (0.1 mg/ml) and proteinase K (0.1 mg/ml) were also tested in the same way.

		% Mortality		
10	Treatment	l day	2	days
	Untreated supernatant	60		100
	Proteinase K treated supernatant	45		100
	Trypsin treated supernatant	40		100
	All controls (no supernatant)	0		0

Example 6

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Entomocidal activity of other Xenorhabdus

Using the methodology of Examples 1 and 2, four different 20 xenorhabdus strains were tested against insect pests. The results obtained were as follows:

I) Activity to Pieris brassicae

Strain deposit	Cells 10 ⁶ /grm diet	Supernatant LC50
no/code	% mortality	μ l/gram of diet
NCIMB 40887	100	0.09
0014	100	0.52
0015	80	3.73
NCIMB 40886	100	0.05

25 It was found that entomocidal activity of cells and supernatant was reduced by more than 99% when all four strains were heated at 80°C for 10 minutes.

II) Activity to mosquitoes (Aedes aegypti)
Bacteria added at the rate of 10⁷cells/ml of water

Strain deposit	Cells 10 ⁶ /grm diet
no/code	% mortality
NCIMB 40887	0
0014	40
0015	45
NCIMB 40886	95

(10mM Tris, 1mM EDTA, pH 8.0).

Furthermore, all strains significantly reduced the growth of Heliothis virescens.

Example 7

Cloning of toxin genes from strains of Xenorhabdus

Total cellular DNA was isolated from NCIMB 40887 and ATCC 19061 using a Quiagen genomic purification DNA kit. Cells were grown in L borth (10g tryptone, 5g yeast extract and 5g NaCl per 1) at 28°C with shaking (150rpm) to an optical density of 1.5 A₆₀₀. Cultures were

harvested by centrifugation at 4000xg and resuspended in 3.5mls of buffer B1 (50mM Tris/HCl, 0.05% Tween 20, 0.5% Triton X-100, pH7.0) and incubated for 30 mins at 50°C. DNA was isolated from bacterial lysates using Quiagen 100/G tips as per manufacturers instructions. The

A representative DNA library was produced using total DNA of NCIMB 40887 and ATTC 19061 partially digested with the restriction enzyme Sau3a. Approximately 20µg of DNA from each strain was incubated at 37°C with 0.25 units of the enzyme. At time intervals of 10, 20, 30, 45 and 60 minutes, samples were withdrawn and heated at 65°C for 15 minutes. To visualise the size of the DNA fragments, the samples were electrophoresed on 0.5% w/v agarose gels.

The DNA samples which contained the highest proportion of 30 to 50kb fragments were combined and treated with 4 units of shrimp alkaline phosphatase (Boehringer) for 15 minutes at 37°C, followed by heat treatment at 65°C to inactivate the phosphatase.

The size selected DNA fragments were ligated into the BamH1 site of the cosmid vector SuperCos! (Stratagent) and packaged into the *Escherichia coli* strain XL Blue 1, using a Gigapack II packaging kit (Stratgene) in accordance with the manufacturers instructions.

To select for cosmid clones with entomocidal activity, individual colonies selected on L agar plates containing 25µq/ml ampicillin, were grown in L broth (containing 15 25μg/ml ampicillin) overnight at 28°C. Broth cultures (50µl) were individually spread onto the surface of insect diet contained in 4.5cm diameter pots, as described in Example 5. To each container 10 neonate P. brassicae larvae were added. Larvae were examined after 20 24, 72 and 96 hours recording mortality and size of surviving larvae. A total of 220 clones of NCIMB 40887 were tested, of which two were found to cause reduction in larval growth and death within 72 hours. Of 370 clones from ATTC 19061, one was found to cause larval 25 death within 72 hours.

Example 8

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Activity of cloned toxin genes to Pieris brassicae

The three active clones from Example 7 were grown in L
broth, containing 25µg/ml ampicillin, for 24 hours at
28°C, on a rotary shaker at 150rpm. The activity of the
toxin clones to neonate larvae were performed by
incorporation of whole broth cultures into insect diet,
as described in Example 1.

Clone No	Strain	LC50 (ul broth/g insect diet)
1	NCIMB 40887	13.03
2	NCIMB 40887	16.7
3	ATTC 19061	108.7
Control*		No effect at 100µl/g

*XL1 Blue E. coli broth

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When E. coli toxin clones were heated at 80°C for 10 minutes and added to the diet at a rate of $100\mu l/g$, no activity to larvae was detected. Highlighting the heat sensitivity of the toxins.

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Example 9 Sequencing of the cloned toxin from NCIMB 40887

Cosmid DNA of the entomocidal clone 1 above from NCIMB 40887 was purified using the Wizard Plus SV DNA system (Promega) in accordance with the manufacturers A partial map of the cloned fragment was instructions. obtained using a range of restriction enzymes EcoR1, BamHl, HindIII, Sall and Sacl as shown in Figure 3. DNA 20 sequencing was intiatiated from pUC18 and pUC19 based sub-clones of the cosmid, using the enzymes EcoR1, BamH1, HindIII, EcoRV and PvuII. Sequence gaps were filled using a primer walking approach on purified cosmid DNA. Sequence reactions were performed using the ABI PRISMTM Dye Terminator Cycle Sequencing Ready Reaction Kit with 25 AmmpliTaq DNA polymerase FS according to the manufacturers instructions. The samples were analysed on an ABI automated sequencer according to the manufacturers instructions. The major part of the DNA sequence for the 30 cloned toxin fragment is shown in Figure 2.

Example 10

Restriction map of cloned toxin from clone 3 Cosmid DNA of the entomocidal clone 3 above was purified as described in Example 9. A restriction map of the cloned fragment was obtained using the restriction enzymes BamH1, HindIII, Sall and Sacl and this is shown in Figure 3. When compared with the map from clone 1 (Figure 3) it is clear that over the regions which overlap, the restriction maps are very similar. 10 only detectable difference between the two clones was a reduction in size of two HindIII fragments in clone 3, corresponding to the 11.4kb and 7.2kb HindIII fragments in clone 1 by approximately 2Kb and 200bp respectively. These results indicate the overall relatedness of the DNA 15 region coding for toxicity in the two bacterial strains.

Example 11

Southern Blot Hybridisation Experiments

A 10.3kb BamH1-Sal1 fragment of the DNA from clone 1 was 20 used as a probe to hybidise to total HindIII digested DNA of the Xenorhabdus strains ATCC 19061, NCIMB 40886 and Hybridisation was performed with 20ng/ml of NCIMB 40887. DIG labelled DNA probe at 65°C for 18 hours. were washed prior to immunological detection twice for 5 25 minutes with 2 x SSC (0.3M NaCl, 30mM sodium citrate, pH 7.0)/0.1% (w/v) sodium dodecyl sulphate at room temperature, and twice for 15 minutes with 0.1 x SSC (15mM NaClm 1.5 mM sodium citrate, pH 7.0) plus 0.1% sodium dodecyl sulphate at 65°C. The probe was labelled 30 and experiments performed in accordance with manufacturers instructions, using a non-radioactive DIG DNA labelling and detection kit (Boehringer). The probe hybridised to a HindIII fragment of approximately 8kb in all three strains as well as an 11.4kb fragment in NCIMB 35 40887 and an approximate 9kb fragment in both NCIMB 40886 and ATCC 19061. These results show that strains NCIMB

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40886 and ATCC 19061 contain DNA with close homology to the toxin gene of clone 1 above, confirming the similarity between the toxins produced by the three strains.

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CLAIMS

- 1. An insecticidal composition adapted for oral administration to an insect comprising a pesticidal material obtainable from a Xenorhabdus species, or a pesticidal fragment thereof, or a pesticidal variant or derivative of either of these.
- 2. A composition according to claim 1 wherein the said pesticidal material comprises material encoded by the nucleotide sequence of Figure 2 or variant or fragment thereof, or a sequence which hybridises with said sequence.

3. A composition according to claim 1 or claim 2 which comprises cells of Xenorhabdus.

- 4. A composition as claimed in any one of the
 preceding claims which comprises supernatant taken from
 cultures of cells of *Xenorhabdus* species.
- A composition according to any one of the preceding claims wherein the Xenorhabdus species is Xenorhabdus
 nematophilus.
 - 6. A composition according to any one of claims 1 to 4 wherein the *Xenorhabdus* species is ATCC 19061, NCIMB 40886 or NCIMB 40887.
 - 7. A composition as claimed in any one of the preceding claims which comprises a further pesticidal material not obtainable from Xenorhabdus.
- 35 8. A composition according to claim 7 wherein the said further pesticidal material comprises a material obtainable from B. thuringiensis.

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- 9. A composition according to claim 8 which further comprises cells of *B. thuringiensis*.
- 10. A composition according to claim 8 wherein the pesticidal materials obtainable from B. thuringiensis comprises the delta endotoxin.
 - 11. A composition according to any one of the preceding claims which further comprises an agriculturally acceptable carrier.
 - 12. A composition according to claim 10 wherein the carrier comprises items of insect diet.
- 13. A method for killing or controlling insect pests, which method comprises administering to a pest or the environment thereof a composition according to any one of the preceding claims.
- 20 14. A method as claimed in claim 12 wherein the pests are insects from the order Lepidoptera or Diptera.
 - 15. A microorganism comprising Xenorhabdus strain NCIMB 40886.
 - 16. A microorganism comprising Xenorhabdus strain NCIMB 40887.
- 17. A pesticidal agent which comprises a a toxin
 30 comprising a protein which is encoded by DNA which
 includes SEQ ID No. 1 or a variant or fragment thereof.
- 18. An isolated pesticidal agent characterised in that it is obtainable from cultures of X. nematophilus or mutants thereof, has oral pesticidal activity against Pieris brassicae, Pieris rapae and Plutella xylostella, is substantially heat stabl to 55°C, is proteinaceous, acts synergistically with B. thuringiensis cells as an

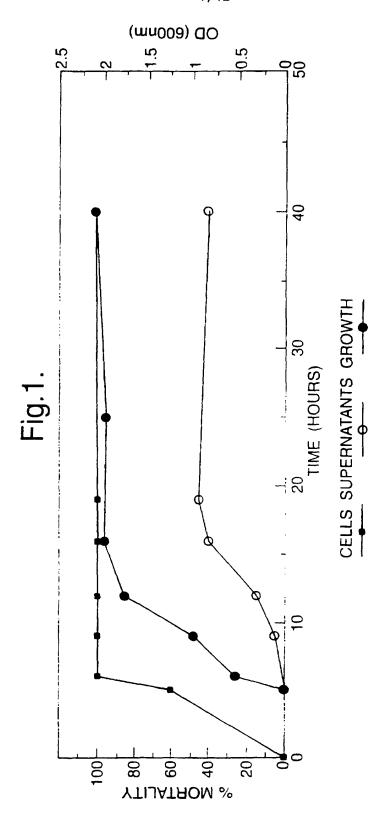
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oral pesticide, and is substantially resistant to proteolysis by trypsin and proteinase K.

- 19. An isolated pesticidal agent as claimed in claim 18 further characterised in that the pesticidal activity is substantially destroyed by treatment with sodium dodecyl sulphate or acetone or heating to 80°C.
- 20. An isolated pesticidal agent as claimed in claim 18 or claim 19 further characterised in that the agent is an extracellular protein.
 - 21. A recombinant DNA which encodes a pesticidal agent according to any one of claims 17 to 20.
 - 22. A recombinant DNA of claim 21 which comprises the sequence of Figure 2 or a variant or fragment thereof.
- 23. A recombinant DNA which comprises or hybridises 20 under stringent conditions with all or part of the sequence of Figure 2, and which encodes a pesticidal material.
- 24. An expression vector comprising a recombinant DNA according to any one of claims 21 to 23.
 - 25. A host organism which has been transformed with an expression vector according to claim 24.
- 26. A host organism as claimed in claim 25 which has been engineered or selected such that it also expresses other pesticidal proteinaceous toxicity enhancing materials
- 27. A host organism comprising a nucleotide sequence coding for a fusion protein comprising a pesticidally active portion of an agent as claimed in any one of claims 17 to 20 in combination with other pesticidal proteinaceous toxicity enhancing materials.

- 28. A host organism as claimed in claim 27 wherein the pesticidal toxicity enhancing materials comprise delta-endotoxin from B. thuringiensis.
- 29. A host organism as claimed in any one of claims 25 to 289 wherein the host is a plant.
- 30. A host organism as claimed in any one of claims 25 to 28 wherein the host is a virus pathogenic to insects.
 - 31. A fusion protein as expressed by a host as claimed in claim 27.
- 15 32. An pesticidal composition comprising one or more agents as claimed in any one of claims 17 to 20.



SUBSTITUTE SHEET (RULE 26)

Fig.2.

	_					
1	TCCACAATTG	CCGGAGAAAA	TCAGTCGGGA	ACTGCCGGTG	ATTATTCGTC	ACTTATTAAA
61	CGAATTTGCC	GACCAGAATA	AGGCTAAAAA	ACTGCTACAG	GCGCAACGCG	ACTCGAACGA
121	AGCGTTAACG	GTAAAGAGTC	ATTCGGATCC	GCTGTATCGC	TTTTGTGGTT	ATCTGGTGTC
181	TGTCAATGAT	ATGACCGGAA	TGAAGATGGG	CAATAAAAAC	ATTAGCCCAC	GAGCACCGAG
241	ATTGTACTTG	TATCATGCCT	ATCTCTCTTT	TATGGAAGCG	CACGGCTTTG	AACGTCCGTT
301	AACACTGACT	AAGTTTGGTG	AATCCATCCC	CAAGATTATG	CTGGAATACC	GGAAGGAGTA
361	TCGAAAAGTG	CGAACCAAGA	AAGGCTATTC	CTATAACGTG	GAATTATCGG	AAGAGGCCGA
421	AGAATGGCTA					
481	GCTTTAAGTC	TGCACTCCAT	ACACAACTTA	AAATATCTAA	TIGTATITAA	AAGAAAATAA
541	TAGATGTATA					
601	AATGGGTGAA					
	AGCAAGGCTT	TCACCCAATT	GTGCAGAGGG	TGCATAACTG	AGAGGGTGAA	AAACATTTC
661	AGGGGGGCTT					
721	ATTTTTTGGT	A L GG CAGG LA	ATTA A A ATCA	TCTAATCATC	CCG1GCTCTT	TARCARTACA
781	AGTTAATCAC					
841	AGTTAATCAC	AATTICATIG	AIGGACTITC	ATTCACACTG	CACCACACA	ATAATICIGI
901	TATATCCTGT	TTCATTACGC	ATTUATUAGG	AGIGCIGIIA	CAGGAGACAA	GAATGTCACA
961	CATCATTTAC	TTGTCGTTAA	AGGGCAAGAA	GCAGGGTTTA	ATTTCAGCGG	GTTGTTCAAC
1021	GCCTGAATCA	ATTGGAAATC	GCTATCAAAA	AGGACGTGAA	GATCAAATAC	AGGTATTGAG
1301	CCTGAATCAT	TCGATGAGCC	GTGACCAGAA	TGTTAATCAT	CAACCCGTCA	GTTTTGTGAA
1141	ACCCATTGAT	AAATCCTCTC	CCCTGTTTGC	TGGATGCCAG	TTTTGTGCAT	TACAGGACAA
1201	GCCAGATGGG	ACAACTGGAG	TTCTTTTATG	AAATCAAGCT	GACCAGTGCC	ACGATTGTGG
1261	ATATTTCCTA	TAATTATCCG	GCATTCAATC	AATGATAATG	GTGCGATACC	CCATGAAGTG
1321	GTGATGCTCG	ATTATAAGTC	CATTTCATGC	AACCACATCG	CCGCAGGACT	TCGGGCTACA
1381	GCATACGCAA	TTAGCCGGAA	GTGAAGAAGC	AAGCCGCTTT	TATCTGGGGT	CTCGAATGTT
1441	AAGCCACTTA	AGAAGCCGCT	GGTTGAAGAA	ACCCCGGTAA	AACCCGCTAA	ACATCATGCC
1501	CGTTATCGTT	GTGTGGATGA	TGACGGCAAT	CTTTTAACCG	AACGCAAGTA	TCGGGTTTGC
1561	CTGCCGGATG	GTCAGATAAA	AGAAGGAAAG	ACTGATAAAC	AAGGTTACAC	CCAATGGCAT
1621	CTTACGGATG	ACAAAAATAA	ACTTGAATTT	CATATTTTAA	AGGATTAATA	CCATGCCAGC
1681	CTATACCGTT	CAGACAAAAA	TAGAATCCAA	CGTACCTGTT	GAAAACCTGC	TTTACGACTT
1741	AACCATTTAT	CCTAACCATC	CAAAAGGAAA	TTTCCATATC	TTGCTTGATG	TTTTTCAGGA
	GAAACTACAG	ACTAATTATC	AAACACAACA	GCATATCACS	CAGGAAATAG	ACGACGATCT
1801	TTCTGTGATT	TATATTATCO	AAATTATGCT	TCLTCCCLLL	CATGGCTCAA	ATATATTTCC
1861	GGCACTGCAA	VCCCD ALLELY	ACANANTCT:	TICACCOCAAA	CANTTANCTT	CCCCTANACC
1921	CTGTTCGGAG	ACCUATITIA	AGAAAATGTA	Ween record	ACTACACTTC	DANCARAGE
1981	TGTCAGCGAC	AAAAAACGGG	WWWIGCCIO	. 17 11000	AGIACAGIIG	CACCAMANCE.
2041	TGTCAGCGAC	GGGGATAATA	CCGIIGAC.I	WWW.W.T.	CARARARC	BARCCIIIIAI
2101	TGCCAAAGAA	TATCCCATIG	GICACCCACA	CONTCONTT	GAAAAAAGIA	AAATIGAATC
2161	ATAAATACAG	GACAGGTTAT	CGAAAAGAA	TIMICCOGNI	CAAAATGGAG	CAAGTTIAIG
2221	TCAGGGCGCG	AGCACACTAT	TTTAGCTGCG	TITTTAAGAT	GATTATCTCT	TAATGTTCAG
2281	TTTTAATAGT	GTTTTTATCG	AGTGAAATTT	AATCGCACAG	GCAATTCTTT	AGACTITTAT
2341	AGAAAACTAA	AGAATTAAAG	AACAAGATIG	ACATTITAAG	TICAAATATI	AATCAAAGTA
2401	TGCTCGCGCC	CTGAGTTTAT	GTGGCCCTGC	CCCLLLILLL	TATTGCCTGC	CAATAGATAG
2461	ACCAGATATT	TATGAGCAAG	CGGCACGAGA	ATTATGGCAA	TATGGCCGAA	CTAAAATTGG
2521	TCAACTGGAA	ATTAAGCCGG	GTGAGGGTTG	CCGACATCCT	AAAGGTACTT	TTTATAATCA
2581	ATATGGTGAA	AGAATATCTG	GGTTAGATTG	GCTGACATTG	GCAAGCCTAA	GAGATTCAGA
2641	AAATATGATG					
2701	GAATGGTTTG	AAAAATCAGG	GTATGAAAAA	GTATTTAGTA	ATGTCGGCTT	ATCCCATTCT
2761	AATATAAATG	ACATAGTAAC	TCTTAGTGAT	TACTATAACA	AAGGATATCA	TGTTGTTACT
2821	TTGATTTCAG	CAGGAATGTT	ATCAGATTTT	GGTGACATAG	AAACATCAGG	AAAAAATCAT
2881	TGGATAGTTT	GGGAAGGAGT	AGTAGAAAAC	TATGAGAAAG	AAAATATCAC	AAATAATTCA
2941	GATCTGAATC	AATATGTAAA	TTTAAATCTG	TTTTCATGGG	GTAAAGTGGA	ACATCAAATT
3001	AAAAAAAACA	AATCACTAGA	TTATGTACTC	AACCATATTT	TTTGAGGGTT	GGTTTTTAAA
3061	CCAATGAAAT	AACATCAAAA	TAATTATTAAA	TATTTTTATT	TTTTTACTT	ALCCLICATOR
3121	TAATCCAACG	ССУУУУСТТТ	TACCAAAATC	AGAGTTTCTT	CCTGATGCAG	TGATAAATGA
	ACCATATCAG	CCAAAAGIII	CCATCACAGG	AGGTGCATTG	AATGAAAAA	CCTTTCCCT
3181	AAAAAATTCAT	CCATCANTIA	CAGGACTARC	ATGGLATCCA	A A A C A T A C T T	CCGTTIGGGI
3241	GGGTGGAAAA	CCIMCIGGCI	CAGGACIAAC	TOGATICA	AAAGAIAGII	CTACCIAIA
3301	AAAA	MAMOMMATAM	TOTAL ACTION	YCU YCM I W Y W	THE TANCAG	TCTN CCCN CC
3361	GAAGACAGAA	IIGAIAAAAA	TIGNAGIGGI	ACCALLIACE ACCALA	AAJALDOOLL	TATACGCACG
3421	GAAAGAGTTC	ACTATAAATT	AIACIAIAAA	TATACTORAL DR	CAACACACACAC	TATCAGAATG
3481	GTGATTTAAT	TCGCCATTTT	TATACTTITG	TATACICICI	CAACATAATC	AGGATTCTTT

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	9					
3541	CTTATTATTT	TTCATGGTGC	TAAAAACGTT	TATTGCAAAA	ATAAATTAAG	TTAATCAGAT
3601	AAATTATCTG	CATTACTGTT	ATAATCGATA	ACACGATAAC	CTGACTITCT	GCCTGTTCTT
3661	ATGAACTCGA	AGATAATCCT	TTCTGAGCCT	GAACGAATCA	CATTGCAACC	ACTCGCTTTG
3721					TACTCATGCT	
3781	AGCAAGCCGT	CCCAGATCAC	CGCTGAAATC	GGATGCAGTC	TCCGGGTTAT	CTGTAATTGG
3841	GTTCACATGT	GGCACAGATA	GCGGGATTAT	TCGGCGGTCA	TGCCGGAGGC	CGGTATCTCG
3901	CCATGACGCC	TGACATGATT	GCCACTGCGC	TCGAAGCCGC	CAGCGCAGAG	TCCCTGACGT
3961					AAACGCTGGC	
4021	AAAAAACAGG	GGCTCCCCTA	TAAACGCCCC	CGCCTGTCGC	TTAAAAAAAG	CGCAATAAAA
4081	CGGAGTTTGC	TGAAAAATCC	GCCTTGCTGA	ATAAAATTAA	GGCCGGAGCA	CAGTCAGGAC
4141	ATTACCGTCT	GGTCTATTTT	GAGTTCTGGG	GGCGTTAAAT	TACACGGATA	ACACGCTGTT
4201					ATTGATTTTT	
4261					ATAATGCGCG	
4321	GGGATAGAGG	AAAAAATCAG	AAATGGCGGG	TGACGAGAAC	ACAACCTGTT	TTTATTCTAT
4381	CTTCCCGCTT	ACAGCCCAGA	GCTGTATCTG	ATTGAAATCG	TCTGGAAACA	GGCCAAATAC
4441					AATATGAGGT	
4501					GAGTACTTAG	
4561					CTGAAAATTT	
4621					GATATIGTIT	
4681					GAATTATAAT	
4741					GGTTGATTTT	
					CTTACTTTTA	
4801					TGCCGTTGGC	
4861					TTCATTTTTT	
4921					TTAACCAGTA	
4981					GGTCAGAATC	
5041						
5101					ATAAGCTGAA	
5161					CCCTGCTTTA	
5221					TGTAACATTA	
5281					ATTCTATTCC	
5341					ATAATTACAA	
5401					TCTTAACTGA	
5461					TTACTCAATA	
5521					TATTTATCCT	
5581					CGCCATCTCT	
5641					ATTTTTACCC	
5 7 01					AGCGTTTCAC	
5761					GGTTCAGTGG	
5821					AAGGACTTAC	
5881					GATCTGACTC	
5941					GAACTGTTGC	
6001	ACCCGCAAGA	CCGGAGGTGA	TTCGGACGCA	TTGATGGAGA	GCCTGTCAAC	TTACCGTCAG
6061					GTCAGGTCAT	
6121					TGGGGCAGGC	
6181	TCATTACTGG	CGATTCTGGC	CAATATTTCT	CCAGAACTGT	ATAACATTIT	GACCGAAGAG
6241					TCAGTGAAAA	
6301					GTCTTGAACT	
6361	CAAAAATACC	TCGGGATGTT	GCAGAATGGC	TATTCTGACA	GCACCTCTGC	TTATGTGGAT
6421	AATATCTCAA	CGGGTTTAGT	GGTCAATAAT	GAAAGTAAAC	TCGAAGCTTA	CAAAATAACA
6481					TIGATCIGAT	
6541					GAGAATTTGG	
6601					CCGGTCCCCT	
6661					ATGAATACAG	
6721					CAAATCAGGG	
6781					AACTGAATAA	
6841					CTATCGTACG	
6901					TCTATACTCT	
6961					ACGGATCGGT	
7021					TTTAATACCC	
					GATCCGGATG	
7081					AACAGTGGTG	
7141						
7201					CTCACACTTT CATCAGCTGA	
7261						
7321	ACIGIGIATG	CITIMIGGIL	1110666	CARTOO CHAK	ACAACGGCTT	CITIGICITO

Fig.2.

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7381 CGGGGAGTTG TCACGGCTGG TTATCTGGTT GTATCAGGTG ACGCAGTGGC TGACTGAGGG
7441 CGGAAATCAC CACTGAAGCG ATCTGGTTAT TATGTACGCC AGAGTTCAGC GGGAATATTT
7501 CACCGGAAAT CAGTAATCTG CTTAATACTC TCCGACCCCG TATTAGTGAA GACATGGCAC
7561 AAAGTAGTGA CCGGGAGCTT CAGGCTGAAA TTCTCGCGCC GTTTATTGCT GCAACGCTGC
7621 ATCTGGCGTC ACCAGATATG GCGCGGTATA TCCTGTTGTG GACTGATAAC CTGCGGCCGG
7681 GCGGCCTGAA TATCGCCGGA TTTATGATGC TGGTGCTGAA AGAGACGCTG AGTGATGAGG 7741 AAACGACCCA ACTGGTTCAA TTCTGCCATG TAATGGCACA GTTATCGCTT TCCGTGCAGA 7801 CACTGCGTCT CAGTGAAGCA GAGCTTTCTG TGCTGGTCAT TTCCGATTTT GTGGTACTGG
7861 GTGCGAGAAG CCAACCGCCG GACAACACAA TATTGATACT CTGTTCTCAC TCTACCGATT
7921 CCACCAGTGG ATTAATGGGC TGGGAAATCC CGGCTCTGAC ACGCTGGATA TGCTGCGCCA
7981 AGCAGACACT CACGGGCGAC AGACTGGGCC TCCGTGATGG GGCTGGACAT CAGTATGGTA 8041 ACGCAGGCCA TGGGTTCCCG CCGGCGTGAA CCAACTTCAG TGTTGGCAGG ATATCAACCC 8101 CGTGTTGCAG TGGATACATG TGGCATCAGC ACTGCTCACT GATGCCGTCG GTTATCCGTA
8161 CGCTGGTGAA TATCCGTTAC GTGACTGCAT TAAACAAAGC CGAGTCGAAT CTGCCTGCCT
8221 GGGATAAGTG GCAGACGCTG GCAGAAAATA TGGCAGCCGG ACTGAGTACA CAACAGGCTC
8281 AGACGCTGGC GGATTATACC GCAGAGCGCC TGAGTAACGT GTTGTGCAAT TGGTTTCTGG
8341 CGAATATCCA GCCAGAAGGG GTGTCCCTGC ACAGCCGGGA TGACCTGTAC AGCTATTTCC 8401 TGATTGATAA TCAGGTCTCT TCTGCCATAA AAACCACCCG ACTGGCAGAG GCCATTGCCG 8461 GTATTCAGCT CTACATCAAC CGGGCGCTGA ACCGGATAGA GCCTAATGCC CGTGCCGATG 8521 TGTCAACCCG CCAGTTTTTT ACCGACTGGA CGGTGAATAA CCGTTACAGC ACCTGGGGCG 8581 GGGTGTCGCG GCTGGTTTAT TATCCGGAAA ATTACATTGA CCCGACCCAG CGTATCGGGC 8641 AGACCCGGAT GATGGATGAA CTGCTGGAAG ATATCAGCCA GAGTCAGCTC AGCCGGGACA 8701 CGGTGGAAGA GGCCTTTAAA ACTTACCTGA CCGCTTTGAA ACCGTGGCAG ACCTGAAAGT 8761 TGTCAGCGCT ATCACCGACA ACGTCAACAG CAACACCGGA CTGACCTGGT TTGTCGGCCA 8821 AACGCGGGA AACCTGCCGG AATATTACTG GCGTAACGTG CATATATCAC GGATGCAGGC 8881 GGGTGAACTG GCCGCCGATG CCTGGAAAGA TTGGACGAAG ATTGATACAG CGGTCAACCC 8941 ATACAAGGAT GCAATACGTC CGGTCATATT CAGGGAACGT TTGCACCTTA TCGTGGGTAG AAAAAGAGGA AGTGGCGAAA AATGGTACTG ATCCGGTGGA AACCTATGAC CGTTTTACTC 9001 TGAAACTGGC GTTTCTGCGT CATGATGGCA GTTGGAGTGC CCCCTGGTCT TACGATATCA 9061 9121 CAACGCAGGT GGAGGCGGTC ACTGACAAAA AACCTGACAC TGAACGCTG GCGCTGGCCG
9181 CATCAGGCTT TCAGGGCGAG GATACTCTGC TGGTGTTTGT GTACAAAACC GGGGTGAGTT
9241 ACCCGGATTT TGGCGACAAC AATAAAAATG TGGCAGGCAT GACCATTTAC GGCGATGGCT
9301 CCTTCAAAAA GATGGAGAAC ACAGCACTCGA GCGTTACAGC CAACTGAAAA ATACCTTTGA
9361 TATCATTCAT ACTCAAGGCA ACGACTTGGT AAGAAAGGCC ACCTATCGTT TCGCGCAGGA 9421 TTTTGAAGTG CCTGCCTCGT TGAATATGGG TTCTGCCATC GGTGATGATA GTCTGACGGT 9481 GATGGAAAAC GGGAATATTC CGCAGATAAC CAGTAAATAC TCCAGCGATA ACCTTGCTAT 9541 TACGCTACAT AACGCCGCTT TCACTGTCAG ATATGATGGC AGTGGCAATG TCATCAGAAA 9601 CAAACAAATC AGCGCCATGA AACTGACGGG GTTGGATGAA AGTCCCAGTA CGGCAATGCA 9661 TTTATCATCG CAAATACCGT TAAACATTAT GGCGGTTACT CTGATCTGGG GGGCCCGATC 9721 ACCGTTTTA TTAAAACGGA AAAACTATAT TGCATCAGTT CAAGGCCACT TGATGAACGC 9781 AGATTACACT AGGCGTTTGA TTCTAACACC AGTTGAAAAT AATTATTATG CCAGATTGTT 9841 CGAGTTCCA TTTTCTCCAA ACACAATTTT AAACACCGTT TTCACGGTTG GTAGCAATAA 9841 CGASTITCCA TITICTCCAA ACACARITI AAACACCGII IICACGGTIG GTAGCAATAA
9901 AACCAGTGAT TITAAAAAGT GCAGTTATGC TGTTGATGGT AATAATTCTC AGGGCTTCCA
9961 GATATITAGT TCCTATCAAT CATCCGGCTG GCTGGATATT GACACAGGTA TTAACAATAC
10021 TGATGTCAAA ATTACGGTGG TAGCTGGCAG TAAAACCCAC ACCTTTACGG CCAGTGACCA
10081 TATTGCTTCC TTGCCGGCAA ACAGTTTTGA TGCTATGCCG TACACCTTTA AGCCACTGGA
10141 AATCGATGCT TCATCGTTGG CCTTTACCAA TAATATTGCT CCTCTGGATA TCGTTTTTGA 10201 GACCAAAGCC AAAGACGGGC GAGTGCTGGG TAAGATCAAG CAAACATTAT CGGTGAAACG 10261 GGTAAATTAT AATCCGGAAG ATATTCTGTT TCTGCGTGAA ACTCATTCGG GTGCCCAATA 10321 TATGCAGCTC GGGGTGTATC GTATTCGTCT TAATACCCTG CTGGCTTCTC AACTGGTATC
10381 CAGAGCAAAC ACGGGCATTG ATACTATCCT GACAATGGAA ACCCAGCGGT TACCGGAACC
10441 TCCGTTGGGA GAAGGCTTCT TTGCCAACTT TGTTCTGCCT AAATATGACC CTGCTGAACA
10501 TGGCGATGAG CGGTGGTTTA AAATCCATAT CGGGAATGTT GGCGGTAACA CGGGAAGGCA 10561 GCCTTATTAC AGCGGAATGT TATCCGATAC GTCGGAAACC AGTATGACAC TGTTTGTCCC 10621 TTATGCCGAA GGGTATTACA TGCATGAAGG TGTCAGATTG GGGGTTGGAT ACCAGAAAAT 10681 TACCTATGAC AACACTTGGG AATCTGCTTT CTTTTATTTT GATGAGACAA AACAGCAATT
10741 TGTATTAATT AACGATGCTG ATCATGATTC AGGAATGACG CAACAGGGGA TCGTGAAAAA
10801 TATCAAGAAA TACAAAGGAT TTTTGAATGT TTCTATCGCA ACGGGCTATT CCGCCCCGAT
10861 GGATTTCAAT AGTGCCAGCG CCCTCTATTA CTGGGAATGT TCTATTACAC CCCGATGATG 10921 TGCTTCCAGC GTTTGCTACA GGAAAAACAA TTCGACGAAG CCACACAATG GATAAACTAC 10981 GTCTATAATC CCGCCGGCTA TATCGTTAAC GGAGAAATCG CCCCCTGGAT CTGGAACTGC 11041 CGGCCGCTGG AAGAGACACT CCTGGAATGC CAATCCGTTG GATGCCATTG ATCCGGATGC 11101 CGTCGCACAA TATGACCCGA CACACTATAA AGTTGCCACC TTTATGCGCC TGTTGGATCA 11161 ACTTATTCTG CGCGGCGATA TGGCCTATCG CGAACTGACC CGCGATGCGT TGAATGAAGC



	1 19.2.					
11221	CAAGATGTGG	TATGTGCGTG	CTTTGGAATT	GCTGGGTGAT	GAGCCGGAGG	ATTACGGCAG
11281	CCAACAGTGG	GCCGCACCGT	CTCTTTCCGT	GGCGGGCAAC	CACACTGTGC	AAGCGGGCTA
11341	TCAACAAGAC	CTTACGGCGC	TAGACAACGG	AGAAGGTTGC	ACTCAACCCC	GCAACGCTAA
11401	CTCGTTGGTG	GTTTGGTCCT	GCCGGAATAT	AACCCGGAAT	CAACCGATTA	CTGGCAAACC
11461	TGCGTTTGCG	CCTGGTTAAC	CTGCGCCATA	ATCCTTCCAT	GACGGGCAAC	CGTTATCGCT
11521	GCCGAATTAC	GCGAGCCTAC	GATCCGAAAG	CGCTGCTCAC	CAGTATGGTA	CAGCCTTCTC
11581	ACCCCCCTAC	TGCAGTGCTG	CCCGCACAT	TGTCGTTATA	CCGCTTCCCG	GTGATGCTGG
11641	AGCGCGCCCCG	CAATCTGGTA	GCGCAATTAA	CCCAGTTCGG	CACCTCTCTG	CTCAGTATGG
11701	CACACCATGA	TGATGCCGAT	GAACTCACCA	CGTTGCTACT	ACAGCAGGGT	ATGGAACTGG
11761	CCACACACAC	CATCCCTATT	CACCAACGAA	CTGTCGATGA	AGTGGATGCT	GATATTGCTG
11821	TATTCCCAGA	GAGCCGCCGC	ACTGCACAAA	ATCGTCTGGA	AAAATACCAG	CAGCTGTATG
	ACCACCATAT	CAACCACGGA	CAACAGCGTG	CGATGTCACT	GTTTGATGCG	GCGCCAGGTC
11881	ACGAGGAIAI	CCCCCACCCA	CTCTCACTAC	CAGAAGGGGT	GGCTGACTTA	CTTCCDDDCC
11941					ACTGCGTGCT	
12001	TCATCCCCT	TTCTCCCACA	CCTTCCCNNT	ATTCCCCAGA	CAAAATCAGC	CCTTCCGAAG
12061	IGAIGICGCI	CCCCCCCCCC	CACTCCCAAA	TTCACCCTCA	TAATGCTGAC	CCTCAACTCA
12121	CCIACCGCCG	CCGCCGTCAG	CARTGOGAAA	AAATACCCCC	CGAAGCAGCA	CACAMCCACC
12181					GTTAGAGCTG	
12241	TGGAATAICA	CAAACCCCTT	TAGGCCCATA	TCCCCCCCA	GCTGAGTGCT	A TOTA TOTA CO
12301	AATTCACAAA	CAAAGCGCIT	TACAGIIGGA	TGCGCGCAA	GCIGAGIGCI	AICIAIIACC
12361	AGTTCTTTGA	CCTGACCCAG	TUTTUTGU	COCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC	GGAAGCGCTG	N CTCCCCCCCTT
12421	TGACCGACAA	CGGTGTTACC	TTTATCCGGG	GIGGGGCCIG	GAACGGTACG	WC I GCGGG I I
12481	TGATGGCGGG	TGAAACGTTG	CIGCIGAATC	TGGCAGAAAT	GGAAAAAGTC	TGGCTGGAGC
12541	GTGATGAGCG	GGCACTGGAA	GTGACCCGTA	CCGTCTCGTT	GGCACAGTTC	TATCAGGCCT
12601	TATCATCAGA	CAACTITAAT	CTGACCGAAA	AACTCACGCA	ATTCCTGCGT	GAAGGGAAAG
12661	GCAACGTAGG	AGCTTCCGGC	AATGAATTAA	AACTCAGTAA	CCGCCAGATA	GAAGCCTCAG
12721	TGCGATTGTC	TGATTTGAAA	ATTTTCAGCG	ATACCCCGGA	AAGCTTTGGC	AATACCCGTC
12781	AGTTGAAACA	AGTGAGTGTC	ACCTTGCCGG	CGCTGGTTGG	TCCGTATGAA	GATATCCGGG
12841	CGGTGCTGAA	TTACGGCGGC	AGCATCGTCA	TGCCACGCGG	TTGCAGTGCT	ATTGCTCTCT
12901	CCCACGGCGT	GAATGACAGT	GGTCAATTTA	TGCTGGATTT	CAACGATTCC	CGTTATCTGC
12961	CGTTTGAAGG	TATTTCCGTG	AATGACAGCG	GTAGCCTGAC	GTTGAGTTTC	CCGGATGCGA
13021	CTGATCGACA	GAAAGCGCTG	CTGGAGAGCC	TGAGCGATAT	CATTCTGCAT	ATCCGCTATA
13081	CCATTCGTTC	TTAATTAAAA	CATTGTGATA	GGCAGGCTCC	TGAGGGAGCC	TGTTTAAGGA
13141	GTTTTTATGC	AGGGTTCAAC	ACCTTTGAAA	CTTGAAATAC	CGTCATTGCC	CTCTGGGGGC
13201	GGATCACTAA	AAGGAATGGG	AGAAGCACTC	AATGCCGTCG	GAGCGGAAGG	GGAGCGTCAT
13261	TTTCACTGCC	CTTGCCGATC	TCTGTCCGGC	GTGGTCTGGT	GCCGGTGCTA	TCACTGAATT
13321	ACAGCAGTAC	TGCTGGCAAT	GGGTCATTCG	GGATGGGGTG	GCAATGTGGG	GTTGGTTTTA
13381	TCAGCCTGCG	TACCGCCAAG	GGCGTTCCGC	ACTATACGGG	ACAAGATGAG	TATCTCGGGC
13441	CGGATGGGGA	AGTGTTGAGT	ATTGTGCCGG	ACAGCCAAGG	GCAACCAGAG	CAACGCACCG
13501	CAACCTCACT	GTTGGGGACG	GTTCTGACAC	AGCCGCCTAC	TGTTACCCGC	TATCAGTCCC
13561	GCGTGGCAGA	AAAAATCGTT	CGTTTAGAAC	ACTGGCAGCC	ACAGCAGAGA	CGTGAGGAAG
13621	AGACGTCTTT	TTGGGTACTT	TTTACTGCGG	ATGGTTTAGT	GCACCTATTC	GGTAAGCATC
13681	ATCATGCACG	TATTGCTGAC	CCGCAGGATG	AAACCAGAAT	TGCCCGCTGG	CTGATGGAGG
13741	AAACCGTCAC	GCATACCGGG	GAACATATTT	ACTATCACTA	TCGGGCAGAA	GACGATCTTG
13801	ACTGTGATGA	GCATGAACTT	GCTCAGCATT	CAGGTGTTAC	GGCCCACCGT	TATCCTGGCA
13861	ACTOCACTAT	GGCAATACTC	AGCCGGAAAC	CGCTTTTTTC	GCGGTAAAAT	CAGGTATCCC
13921	TCTTCNTNNT	CACTCCTTCT	TTCATCTCCT	ATTTGATTAC	GGTGAGCGCT	TATCTTCGCT
13921					TCTGAAAACA	
14041	ANACICCGIA	TETCETCCC	ACAGTTTCTC	CCGCTATGAA	TATGGGTTTG	AAATTCGAAC
	CCCTCCCTTC	TGTCGCCAAG	TTCTGATGTT	TCATCAGCTG	AAAGCGCTGG	CAGGGGAAAA
14101 14161	CCGICGCIIG	CANACACCCC	CCCTCCTTTC	CCGTCTTATT	CTGGATTATG	ACCTGAACAA
	GGIIGCAGAA	TTCCTCCAAA	CCCCCCCAC	ACTEGECCEAT	GAAACGGACG	GTACGCCAGT
14221	CAMOGITICE	TIGCIGCTON	TCCATTATCA	ACGTGTTAAT	CATGGCGTGA	ATCTGAACTG
14281	GAIGAIGICC	CCGCIGGAMA	AAAAAATCAA	CACCITICAL	CCATACCAAT	WICIGWWCIO
14341	GUAGTULATG	CCGCWGTING	WWWWWW TOWN	ATCACCATAC	TCAGAAAGCC	TCCTCCTACC
14401	ATATGGAGAA	GGAATTICCG	ACCCCCC A ACC	CYPCCYPACC	GGTTACCTAT	CACCACCCC
14461	GTGCTCCGGT	ACGGGATATC	ACIGCCGAAG	ANACCOCCE	COLINCTIAL	ACCA ACCCC
14521	AACCACTGCC	ACATATTCCG	GUALAALAGG	CACCOURT	GTTGTTGGAC	ATCAATGGTG
14581	ACGGGCGTCT	GGATTGGGTG	ATTACGGCAT	TATOCOCTIACG	GGGCTACCAC	ACCATGTCAC
14641	CGGAAGGTGA	ATGGACACCC	TTTATTCCAT	CTCCCCTGT	GCCAATGGAA	TATTTCCATC
14701	CGCAGGCAAA	ACTGGCTGAT	ATTGATGGGG	CIGGGCIGCC	TGACTTAGCG	CTTATCGGGC
14761	CALATAGTGT	ACGTGTCTGG	TCAAATAATC	CGGCAGGATG	GGATCGCGCT	CAGGATGTTA
14821	TTCATTTGTC	AAATAAGCCA	CIGCCGGTTC	CCGGCAAAAA	TAAGCGTCAT	CITGTCGCAT
14881	TCAGTGATAT	GACAGGCTCC	GGGCAATCAC	ATCTGGTGGA	AGTTACGGCA	AATAGCGTGC
14941	GCTACTGGCC	GAACCTGGGG	CATGGAAAAT	TIGGTGAGCC	TCTGATGATA	ACAGGCTTCC
15001	AAATTACGGG	GAAACGTTTA	ACCCCCACAG	ACTGTATATG	GTAGACCTAA	ATGGCTCAGG

	3					
15061						AATGAAAGCG
15121	GCAATCATTC	TGCTGAACCT	CAGCGTATTG	ATCTGCCGGA	TGGGGTACGT	TITGATGATA
15181					TGCCAGCATT	
15241					CATATTCAAG	
15301					GTATTATCGC	
15361					GATGACGGTG	
15421	TACCGTTCCC	GGTGCATGTG	TTGTGGCGCA	CGGAAGTGCT	GGATGAAATT	TCCGGTAACC
15481	GATTGACCAG	CCATTATCAT	TACTCACATG	GTGCCTGGGA	TGGTCTGGAA	CGGGAGTTTC
15541	GTGGTTTTGG	GCGGGTGACG	CAAACTGATA	TTGATTCACG	GGCGAGTGCG	ACACAGGGA
15601	CACATGCTGA	ACCACCGCCA	CCTTCGCGCA	CCCLALY VALCE	GTACGGCACT	CCCCTACCCC
	A A CTICCATATA	TOTAL COOCA	2000320000	CCCACCCCCA	TCARCACACA	GGCGTACGGG
15661					TCAACAGGCA	
15721					TGATATGACG	
15781					ACAACGTTTA	
15841	TGTATGGGGA	TGATGATTCT	ATACTGGCCG	GTACGCCTTA	TTCAGTGGAT	GAATCCCGCA
15901					TGCGGTACTG	
15961					TTCCACAGTG	
					ATCTTGAGAT	
16021						
16081					TGCCCGAAAC	
16141					GCCAGCGTTT	
16201	CATCTGAATC	ATGATGATAA	TACGTGGATC	ACAGGGCTTA	TGGATACCTC	ACGCAGTGAC
16261					TTTCCCTTGA	
					CCGATTATCT	
16321						
16381					CTCCGCTGGT	
16441					AGGAGGTGAT	
16501					CAAAAGTGCC	
16561	AAGACAGATT	TCCATGTCTG	GGTGGGACAA	AAGGAATTTA	CAGAATATGC	CGGTGCAGAC
16621					CAGGTCAAAC	
					CGGCTGGCCT	
16681					CAGATATCAA	
16741						
16801					TCCGTTTCTG	
168 61	AACGGTGAAA	AACAAGGATA	TACCCCTGCG	GAAAATGAAA	CTGTCCCCTT	TATTGTCCCC
16921	ACAACGGTGG	ATGATGCTCT	GGCATTGAAA	CCCGGCATAC	CTGTTGCAGG	GCTGATGGTT
16981					ATGATGGGGA	
					TCCTGTCGCT	
17041	GAGLIGAAAC	CGGCTGGGAT	TO COCCETO CO	.maga:a	A CTCA A CTCA	1001111000
17101	CGCTGGCATC	AAAATAACCC	1666661666	A.SCCAAASC	AAGTCAATTC	ACAGAACCCA
17161	CCCCATGTAC	TGAGTGTGAT	CACCGACCGC	TATGATGCCG	ATCCGGAACA	ACAATTACGT
17221					CAAACAGCCG	
17281	AAGTGGTGAA	GCCTGGGTAC	CTGATGAGTA	TGGAGCCAAT	GTGGCTGAAA	ATCAAGGCGC
17341					CCCGGACGTA	
17401	A CCCCA A A A C	CCNANCCCCC	TOCOTTACO	TTOLLLCCT	ATTCCTGAAA	עא אידייירכיכיכ
					TATGCCGATA	
17461						
17521						TCGATCCTTA
17581					CTCCCGGTGA	
17641	AAAGCTCAGT	GATGCCTGTT	CACTGAACAG	ACATCACTCC	ATTTAGGAAT	GAATCATGAA
17701	CALTTTCCTT	CACAGCAATA	CGCCATCCGT	CACCGTACTG	GACAACCGTG	GTCAGACAGT
17761					GTAACCGATG	
	ACGCGAAAIA	GCCIGGIAIC	ANCERCECE	CICRCICAG	ATTCATCCC	CATCAC
17821	CGGTTATCAA	TAIGAIGCIC	AAGGAICICI	GACICAGAGI	ATTGATCCGC	GATTITATGA
17881	ACGCCAGCAG	ACAGCGAGTG	ACAAGAACGC	CATTACACCC	AATCTTATTC	TCTTGTCATC
17941					GGAACCCGTG	
18001	TGATGTTGCC	GGGCGTCCCG	TTTTAGCTGT	CAGCGCCAAT	GGCGTTAGCC	GAACGTTTCA
18061	GTATGAAAGT	GATAACCTTC	CGGGACGATT	GCTAACGATT	ACCGAGCAGG	TAAAAGGAGA
18121					ACGCCGGCAG	
	GAACGCCIGI	AT CACOGAGC	TOCTOCATA	TOTALOGAMAI	CCAATCAATC	AAAAAGGCAA
18181					GGAATGAATC	
18241					TTAGTGAAAG	
18301					GCGCTGGCGC	
18361	CACTTCTGTC	AGCACAACGG	ATGCTACCGG	CACGGTATTA	ACGAGTACAG	ATGCTGCCGG
18421					CAAGGCAGTT	
18481	Chrockyy	CANCANCANC	TTATCGTGAA	ATTCCTGACC	TATTCGGCTG	CCACCCACAA
18541					ACCTATGAAC	
18601					GCCGCTGGGG	
18661	ACAAAACCTG	CGTTATGAAT	ATGATCCTGT	CGGAAATGTG	CTGAAATCAA	CTAATGATGC
18721	TGAAATTACC	CGCTTTTGGC	GCAACCAGAA	AATTGTACCG	GAAAATACTT	ACACCTATGA
18781					GCGAATATTG	
18841	אברכים	CCCATCCCC	CTCTCTTTC	TLACARTICT	TATACGAATT	DOTOTOOCD C
70041	MARCCAGIIA		CICIONIIGN		TUTUCOWILL	WC 1 C 1 C C C C C C C

	Fig.2.					
18901	TTACGACTAT	GATCGTGGGG	GAATCTGACC	AGAATCGCAT	AATTCACGAT	CACCGGTAAT
18961	AACTATACAA	CGAACATGAC	CGTTTCAGAT	CACAGCAACC	GGGCTGTACT	GGAAGAGCTG
19021	GCGCAAGATC	CCACTCAGGT	GGATATGTTG	TTCACCCCCG	GCGGGCATCA	GACCCGCCTT
19081	GTTCCCGGTC	AGGATCTTTT	CTGGACACCC	CGTGACGAAT	TGCAACAAGT	GATATTCCTC
19141	AATAGGGAAA	ATACGACGCC	TGATCAGGAA	TTCTACCGTT	ATGATGCAGA	CAGTCAGCGT
19201	GTCATTAAGA	CTCATATTCA	GAAGACAGGT	AACAGTGAGC	AAATACAGCG	יי מיי מייד מיי ב ב
19261	TTGCCAGAGC	TGGAATGGCG	CACGACATAT	AGCGGCAATA	CATTAAAAGA	CHALLACTOR
19321	GTCATCACTG	TCGGTGAAGC	GGGTCAGGCA	CAAGTGCGGG	TGCTGCATTG	GGAAACAGGC
19381	AAACCGGCGG	ATATCAGCAA	TGATCAGCTG	CGCTACAGTT	ATGGCAACCT	GATTGGCAGT
19441	AGCGGGCTGG	AATTGGGACA	GTGACGGGCA	GATCATTAGT	CAGGAAGAAT	ATTACCCCTA
19501	TGGGGGAACC	GCCGTGTGGG	CACCCGAAAT	CAGTCAGAAG	CTGATTACAC	AAGCCGGCGT
19561	TATTCTGGCA	AAGAGCGGGA	TGCAACAGGG	TTGTATTACT	ACGGCTATCG	TTATTATCAA
19621	TCGTGGACAG	GGCGATGGTT	GAGTGTAGAT	CCTGCCGGTG	AGGCCGATGG	TCTCAATTTG
19681	TTCCGAATGT	GCAGGAATAA	CCCCATCGTT	TTTTCTGATT	CTGATGGTCG	TTTCCCCGGT
19741	CAGGGTGTCC	TTGCCTGGAT	AGGGAAAAAA	GCGTATCGAA	AGGCAGTCAA	CATCACGACA
198 01	GAACACCTGC	TTGAACAAGG	CGCTTCCTTT	GATACGTTCT	TGAAATTAAA	CCGAGGATTG
19861	CGAACGTTTG	TTTTGGGTGT	GGGGGTACAA	GTCTGGGGGT	GAAGCGGCCA	CGATTGCAGG
19921	AGCGTCGCCT	TGGGGGATCG	TCGGGGCTGC	CATTGGTGGT	TTTGTCTCCG	GGGCGGTGAT
19981	GGGGTTTTTC	GCGAACAACA	TCTCAGAAAA	AATTGGGGAA	GTTTTAAGTT	ATCTGACGCG
20041	TAAACGTTCT	GCTCCTGTTC	AGGTAGGCGC	TTTTGTTGTC	ACATCGCTTG	TGACGTCTGC
20101	ACTATTTAAC	AGCTCTTCGA	CAGGTACCGC	CATTTCCGCA	GCAACAGCGG	TCACCGTTGG
20151	AGGATTAATG	GCTTTAGCCG	GAGAACATAA	CACGGGCATG	GCTATCAGTA	TTGCCACACC
20221	CGCCGGACAA	AGTACGCTGG	ATACGCTCAG	GCCCGGTAAT	GTCAGCGCGC	CAGAGCGGTT
20281	AGGGCACTAT	CAGGCGCAAT	TATTGGCGGC	ATATTACTTG	GCCGCCATCA	GGGAAGTTCT
20341	GAGCTGGGTG	AACGGGCAGC	GATTGGTGCT	ATGTATGGTG	CTCGATGGGG	AAGGATCATT
20401	GGTAATCTAT	GGGATGGCCC	TTATCGGTTT	ATCGGCAGGT	TACTGCTCAG	AAGAGGCATT
20461	AGCTCTGCCA	TTTCCCACGC	TGTCAGTTCC	AGGAGCTGGT	TTGGCCGAAT	GATAGGAGAA
20521	AGTGTCGGGA	GAAATATTTC	TGAAGTATTA	TTACCTTATA	GCCGTACACC	CGGTGAATGG
20581	GTTGGTGCAG	CCATTGGCGG	GACAGCCGCG	GCCGCTCATC	ATGCCGTTGG	AGGGGAAGTT
20641	GCCAATGCCG	CTAGCCGGGT	TACCTGGAGC	GGCTTTAAGC	GGGCTTTTAA	TAACTTCTTC
20701	TTTAACGCCT	CTGCACGTCA	TAATGAATCC	GAAGCATAAC	AATCATGTTC	ATTCCCACTT
20761	TGTCATGGAT	GACAAGGTGG	GTTTTTCGGA	TGTGTGGACA	GAGACCCGTA	CAGGGTCTCT
20821	GTCCAGTTAA		AAGAACGAAT	GGTGTAACGG	ATATGCAAAA	TGATATCGCT
20881	CAGGCTGAGC	AATAAGCTTT	TCTGTTTACC	ACTGATACCG	GGAAAACTGA	GGGTTAATGT
20941	GCCTGTATCG	GCCACAGGAA	GCCCTTCAAA	TGGCAGGTAC	TTAGCATCAT	TGAAATCCAT
21001	CIGGAATIGA	CCACTGTCAT	TCATGCCATG	TGAGATCACA	ATCGCTTTGC	AGCCACGTGG
21061	CATCATIGIA	CTGCCGCCAT	AACICAGIAI TTTTCTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	1 GCCCGGACA	TUCTGATAAG	GCCCTAAAAG
21121	GGCAGGTAAC	STUDENCE CE	CCCATTACTOR	ACGGCGTGTA	TTACCTAAAC	CGTCAGGATA
21181 21241	ATCGGTAGCA CTTCDDDAGCA	ATATTCAGAT	TOCOTOCA	CAGGC IGGCT	TGCAGTTGTG	TCCCTTCGAC
	GIICAAACCG	TTAAGCGTTG AAAATGAAAC	10CC10C4C1	GCCTTCACCT	GCATTGACTA	ACTCAGTCAC
21301 21361	GGTTCTGGTG	AAAAIGAAAC	CCCCTTCXTC	CMCMCCACCA	TACACTICAG	CCAGAGAAAC
21361	TARRETCACC	ATCAGGGTTT	CCCCTTCATC	TANACCCCCA	TARCTITITI	CCATCTGTGC
21421	TAAATICAGC	AAGTGTGCTG	CACCCOCIAA	CARTTCATAC	TCATAACTCCCAT	GCCAAGCACC
21541	TAAACAGAGT	CACACCCCCA	AATCATAAAA	CTCTTATAC	ATACCCCACA	A COMPOSA CO
21601	GAGCCAGTTG	TATACCCCCC	CATCATAGAG	CIGAINAIAA	ALAGEGGACA	ACGITCCACG
21661	AGTTTGTGCC	TECTEACTTT	CCACATACTT	TITACITIEC	ACAMAGGCIA	CACCACCTAC
21721	AGCCAGCGTC	CCTAATTGAG	CATCAATTC	TITIOIANI	CCTTCCGCAT	TATTCCCCTC
21781	AATTTCCCAC	TCTTGCCGAC	GGCGACGGTA	TATTTCTCA	TCCCTCATT	TATIGUGUIG
21841	AATACGTGTT	GCTGACGCAG	AAATTTCGAT	ACCANTCGCA	CTCCCATTCA	ANACCCCCCC
21901	AAAACGGGAA	CCTCCCACAG	CAAAACCGTA	AATATTGGGG	ACCACATOTC	CCCCCCCCC
21961	GGCCATATGC	AGGGCTGTGC	CCCTCCTCCT	CAAGACCGAT	CAACACACCT	AAACATCCAT
22021	CGCTTGTTTT	TCACCAGCGT	TAACATCTTC	GTCGTACAGC	CLTALLCTYTC	TCTCXXXXCC
22081	AGACTGTGCA	CCATGACGGC	THE TOTAL PARTY OF THE	CCCCAATTTA	TCDCCDTCDA	THTCACCCAT
22141	GACCTTATCC	TGCATTTTAA	TACTTTGCAG	GGCTAACTCA	CTGCCTTGAG	TTTCCOCCAI
22201	TTCAGCCAAG	GCTTCTGCAT	CCTGCCGTTC	AGTAATGCTG	AGCAGGGTAT	TGCCABIAT
22261	TATCAACTGG	CTTACCCCCC	ACTTGGCATT	TTCCAGAATC	ACCGGAAAAC	CCTACATICC
22321						

22681 CACCCAATAA AGTGAGCGCC TGTACATACC ACATTTTAGC TTCGTTTAAG GTATCACGTT

CATCACTGCA TGAGGTAAAT CGCCGCCGCC TTGTGAAGCA GTGATGGCAG CACTGAGTAA

CATGGACGGA TCTGCGGGCG TGGCATAGAG AGATAATGAC AGTGGCTGAC CGTCGATTGT

CARGUAGGA TOTAGGGGG TOTAGGGGGTTG CGTCAATGTC TGCCAGTAAC CTTGCAGTTT
TTATTAATT TGAGGGAGGA ACAATGCGGT TAACGAAATT TGCCGTACGT TTCGTGGGTA
ATGCAGCGCG CTGACCCAGT TGCAGCATTT TATGTTGATA ATGATGCCGC ATTGTTTGGC

TGGCAGCTTC TTCCAGCCGT GGCTCTGACC AATCGTTATC CAATGAAAAA TAAGGCTCAT

22381

22441 22501 22561

22621

	_					
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22801	TAGCCACTTT	ATAGTGCATC	GGATCATGCT	GGGCAACGGC	GTCCGGATCG	ACCGAATCCA
				CCAATGGGCG		TAATAATCCT
22861						
22921		CTGAACCGAA			TAGCGCAGCC	
22981		TCTGCTCTTG		TGGAATACCA		TGTAATAGAA
23041	CAATCCCAAG	AAATAGATTG	CATTGGCGCC	GTTTGAAATC	CATGGGTTCA	GTGTTATTTT
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23161				AGTGAATATA		
				GTCATAGATA		
23221						
23281		CCTTCACGTA		TTTAGCATAG		
23341				ATAAGGTTGT		TGCCATCAAT
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	AGTATTTAAC			CTGCATATAT		ATGGCATTIT
23581						
23641				GGATTTTAGT		
23701	AATAACAATA			TTGCTTAATA		TCACCAGAGG
23761	AATATCATAG	CCTTCAATAT	CAACTITIAC	TTGATTAAAA	TCATATACCA	TAGGGTCAGA
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23881				ATCTTGGATC		
	2 V Chaladaly dan.	ATCTCTCCCT	CCTTCAACAT	AAATACACCC	ATCCATCCTC	CCCAACCAAC
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24001	AGTGCCGCAA					TGATTCACAT
24061				CAATCTAATA		
24121	AATTCAGCAT	CATCTGATTC	ATAATCATAA	TTTATACCAA		TGATTTTCTA
24181	GGAATTTTTT	CCTTGGTTCT	TAGATGCATT	AACACTCTAA	AATATTCGGC	ATTTTTAAGA
24241	TCGATGGAAA			TAATGAAAAA		TTTTCCAAGC
	ATTTCATCAT			ATAACCGTTT		
24301	ATTICATORI	COMORMORM	AT CARATIANA	CCTTTTGAAA	P V JALLY V JALLEC	CATTGAAGGA
24361	AGGTATITAA	CCICAICAII	AIAIAIAIIG	CCTTTTOAAA	AGITAGITE	
24421	TTGAACGTTA	AATTAATATG	ACCATITCCT	GGTGATATAT	ACGAGAGATC	
24481				GTTATAGATT		GGCCAAATAA
24541	TCTGTAGCAA	ATTGATTGTT	GACTTTGTAT	TCTGTCCTGG	TATCAAGTTC	TGATAATGTG
24601	CTCTTAACAA	TGGCGTCTAA	ATCATTTTCT	GTGAGAATGG	ATAATGTCAT	ATCAGGGTTA
	ATGGTCATCC	ا المحليات المحليات المحليات	ACCAAGACTA	TTAAAAGAAT	AATTGTCTTT	TTTCTCATGG
24661				TCAGAAGAAC		
24721	AAATAAACAA					AATGCTGGCT
24781	TTTTTATTGA			GTCACATTAA		TGAGCTCCAG
24841				TAATATAAA		TATCTTGCCA
24901	TCTTCACTTT	CATTTTTCAG	CTCTTTTTGT	TCCAGCCACA	GTAAATACAA	ACGAGACTTG
24961	TAAATAACAG	GTCTGATATT	TTCCTGCCAT	ACATTGATGG	GTATTTCAAT	TTTTTTCCAT
	TCTCCCCAGG	CATTGGCAGC			TTTGGTGATC	
25021				TAACCAATTA		
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25141	ACATTAATAC	TGTCATGATA		ACCTGCAAGT	TAGCGACATC	TTCAAATGCG
25201	GTCAGATAAT	TTTTAAAGCT	ATCTTCAACG	GTATCGATAT	TTAACTGACT	TTGGGAAAGT
25261	TGCTGTAACA	GGTTGTTCAT	CATACCTGTC	TGACCAATAC	GAATCGTGGG	GTCGATATAG
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		CGCAGAAGAA			TTGATACTIT	TCCTTCAACA
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25681	DATCACT	CGGCTTGCCA	ATCATCAAAT	GTTGGCATCG	GGGTTTCCGG	TTCACCGACA
25741	The Withham With	TTATCACTCC	ACCAACACCA	TCCGGGGTAA	TACCCAATGT	AGCAGCGACA
	TALITIMATI	CCACACTCAC	ATCTATA ACT	TCTCCAGTTG	GTD A ACCTAT	TCACTCCCAA
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25921	AATTGTTCGG	CAGTCAACGC	TCCTAAGTTC	CAAATGCTGT	TAAGATICIG	TCGCGTAGCT
25981	TCACAACGCA	TGATCACAGC	ATGGAAGCGG	GTCAGCGCTT	GCAAAGTGGG	GAGATCATGT
26041	TGCAGTGCTG	TGGTTTCTGA	TTGGAATTTC	TCCGGTTTTG	TCACCAACAG	GGTCAGTTCG
26101	ر تاساب المسلملية 1961:010	GTCCAATATT	GCGCACAATC	AGAGAAAGTT	GCCCCAGTAC	CTGACAAAA
	TITICGCIGA		VALCACACY C	CGATCACGGT	TACCCCCAAT	אארראשריאאא
26161	GULACUATGT	IGCIGGIIIC	WITCIFIGMG	COUTCWCOOT	TURCCOCHAI	POMMODOCH PRICHIGHNY
26221	TCATCGAATG	TUAGTCCTTG	IGGITTTATC	TGATTAATCC	ACAGCAAAAT	AGITTUTGUT
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	OUCCUTIICI	Cycyyyyyy	GGCLATTTTC	GTGTTCACAT	ACCCACAAAAC	CCACAACAAC
26521	MALOUIGIAI	CHOMMANDAG	CGCAA-111C	J.J. LACAI	HAMONOPOL	CONCONCANC

	riy.z.					
26581		CATTCACTGT	CAGATGATGA	ATGTCTGCCA	GCAGACGAAC	GCGATAAAGC
26641	AGAGACAGGT	TCTCGATGGA	ACACATAAAT	TCTGGATTTG	TTCCGCCATT	AGCCAGTTTC
26701		ACAGTTCAGT				
26761		TTGATTCACC				
26821		ATAGCGGTGT				
26881		TGATATCTGA				
26941		AATATTGAAC				
27001	TCATCATAAA	TACTTTCTAT	TACTTGCCAG	ATATCTTCTG	GAGATATGCC	TGTGGCTTTA
27061	TACAAACGAA	TCGCTTTATT	CAGCTTTAAC	AGGAATATAT	CACCGGGAAC	TCCATCATTT
27121		ATTGGCATTG				
27181	TGTTATACCG	TTGGTGATTT	GCTCTGTCGT	CAATTTAATG	GGAATACTGT	AATGGGTATT
27241		ACGAAATTTT				
27301		TGGTCAGGTT				
27361		ATTAGCTCTG				
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27601		CCGAAATTTT				
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29401		CCGCACTCGC				
29461		CAAAACTAAG				
29521		TCAAAACTTA				
29581	ACGTTGACGG	ATGTAAATAT	ACAGTATTAT	AGTCCTTTGA	TATGTTATTA	AATTGAAAAA
29641	CCTTTAAACT	ATATTCGGGG	GAAATTATTA	TGTCAGATGT	TCGTAATATT	ATTAATGTTG
29701	ATAACAATTT	TGGTTGTGAA	TATAAAGCGG	ATITATITAA	ATAAGTTTTC	ATAATTGTGA
29761		TTTCTCATCC				
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29881	ATGCAAGGAT	TGCCATAGAC	GITCAATTIT	ATTCAACCAC	ACCORPORATAGG	TOGGTAAAAA
29941	GAGAAGATTA	AATTTGGGAT	A COTTON TO COTTO	CCAAACCCCIG	ACCITCCGGC	TCTTATGAAT
30001		TCTAAAATTA				
30061		TTGATAAATA GCGTTGAGGC				
30121		TGTTGCCCTT				
30181	AACACGCTTT	TCCTCATAGA	ACACCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC	GICIGOWCE	WITTICACCI.	A A COTTOTO
30241	GICCACCICA	CATTTTTCA	TCATACTCAG	GGTCAGGCAA	AGCWI IRRAY.	WALE LELEGE
30301 30361	TTCCCCANAC	GATGCCCGTC	CGCCAAAAGT	AGCGATAGAG	CCLV CLLLCy	GAGAGCGATC
20201	LICOCCAMAC	CAIGCCCGIC	COCCIONO		COLACITICA	GAGAGCGAIG

30403	m1 mmc1 cm1 c		TT > > CTC > >	m,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	~~~~~~~~~	63.3.600.03.
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	TATCCCGGGT	TTTCTGGATA				GGTATTGATG
30721						
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31021	•		CTTTCAGTAA			TGAACTACAT
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31141	AATTATGTCT		CTAAAGGCAA			TTAAAACAAA
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31261	AATTAAGTTT	ATATTTCATC	TGGTTTCTGC	AATTAAGTTT	TAAAAATTAA	TTCTACTTTT
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31381	TTATATAGTA	AATAAATTCT	GTTGGATGTG	ATTATTATTG	TGAGACGGTA	ATAATTAACA
31441	TAACAGAAAA		GGAAATTCAA	TCAACTTTTG		TGACCATGAA
			CTCGCATTGA			
31501	GAGCTGTATT					CGAGTGTTGG
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32161	CTGACACATA	AAAGCATTGC	CTTGATGGAG	CTGGTACAAA	AACATATCCG	TTGCCGGGAT
32221		GGGTTCCCCA	ATTGGTGGCG	TTGTTGAATG	CCGGTTATAA	TAGCGCCGAA
32281	CAGCGCCATG		CTATATTTTA		ATACGCTGGA	TCTCGCCCAG
	TTTTTTCTCATC	AACTGACTGA		GAGCATGAAA	CCATGTTGAT	GACTATTGCA
32341						
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32521	AGTCTGGACA	TCATTGTCAC	CAGTACCGGC	CTGAGCCGGG	AGAAAATTGA	AGCGTTAAAG
32581	CATTAAATGG	ATACGCTTTT	TCACAGCAGG	ATATGGTGAC	CCCTGTGAGG	CCACCGGAAA
32641	ATTTTATTTA	CTACGATTTA	CGACGGGTTA	CTTTAGGAAG	CTGAATGAGA	CGTCCTTTGT
32701	TATATAACGG	TCCCATATCA	ATCTTCTCTT	TTCCGCGTAC	AGGTAAGTAA	
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33121	GGTGAATTTT	CTCCGGTTGT	ACACCTTGTG	ACAGTAAAAA	GCGGATCGCC	TCATCTGCCG
33181			GGATTGGGCG			
			TGGTGACCGA			
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33601	GCACGTTGCT					
33661	ATACTGAATG	CCACTTCCAC	CTTATCCCCT	CCLCLCLANCE	Calculation of the Calculation o	CACATTACCC
	AATCCCCCCA					
33721						
33781	CTGGCATCAC					
33841	TAAGGATCAA					
33901	TCTGCTTGCC	GGTTCCACCC	GTCAACAACC	TCATTAATCC	GTTCGGATAA	CTTGCCTTTG
33961	TCACCGTTGA	CGGCCATAAA	ACTGAAAATC	AGGCGGTCGT	AGGCGGTAGG	CGGGATTTTT
34021	TCCAGATCAA	AACCACGGCC	GGGGGCATCG	TCGCTGGTCA	GCGCAGTGTT	VACCACCAL.
34081	TCTGGCGACA					
	AGCGGTTCTG	Trace Cock I C	ATROLOGERC	TETTOCOTAN	Y C Y C C C Y COM	GCC
	AGCGGTTCTG	INITITIOGG	WICHWEITER	CCCTCTCCCTCC	MANAGE ACTT	GGCAACACGT
34201	GCTGAAGAAT	AACTCAAAGG	AGTICCECTE	CCGICAGGTT	TATATCCCAC	CITCTGATAG



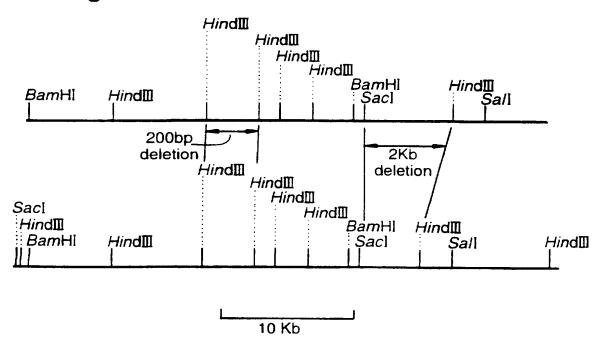
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34261		TGAGTGCATC	ATATTGCAAT	ACCTCGGTTT	TTTCTCCCGG	CGGTACATCA
34321	GGCGTATTGG	GGTTACCGTG	ATCGGCAATT	TCTTCCGGTG	TCGCCTCACG	GACATATTGC
34381						ATGCCAGCGT
34441						GGTTTGACCA
34501	CCAGATTGAT	TCTGCCAGGC	AACCAGAGAT	GCGCCTACTT	CGCTGCTGGC	GTCAGACATC
34561	CCLLLY VILLE	AAGGGTATCG	ATAAACATTT	TGAGACATAA	Talancy Calaca	GGCCCCCTTA
34621	TATTCCCCC	CCGGCTCCTG	ATATCACTTA	CAATTCTCTT	CTTTCACTICC	PACACACA IN
34681		GAACCTGCTG				
		GGAGGATAAT				
34741						
34801	AATTULAACT	TCCACTGTGA	AAIGGCGCCI	TOCK TOCAL	AAGGCAGGAA	AAGTTCATCA
34861	TCAAAATTGA	GCCTGAACAT	GCCGCTGTCT	TCCATGGCCG	TTGAAATCAC	CACACCTIGA
34921		CGTTCAGCAA				
34981		TTTTTAAGTC				
35041		CTTCATAAGG				
35101	CGCCGATCAG	CGTGGGTCGG	ATAATCGCGC	AAGAACATTT	CGGCGCTCAG	TAAGAAAGTG
35161		TACTCTTGCC				
35221		TGATCTCCAG				
35281		ATTTCAGATG				
35341		CGAAATTCAT				
35401		GGGAATTAAC				
35461	TCATCCACAT	GTATAACGCA	TCATTGGTAN	ANTTGTTCNN	NNNNNNNNN	NNNNNNNNC
35521	CCGAAGCATA	CCGCCAAGAC	CATCCCCCCG	ACGGCCAGAC	CGAAAATATT	GGGAACCATA
35581	TCCGCCACAG	CGGCCGCAGT	GGCGGCTGAC	TGGGCAGCGA	TCACACCTTC	AGCCGCTCTT
35641		CGATAACTTC				
35701		GGCGCTCCTG				
35761		CAATCGCTTG				
35821		GGAAGTGTTC				
35881		ACTGAATCAG				
35941		TCGGGATTGC				
36001		GCCTGAGCAG				
36061		CATCCAAGGT				
36121		TGAGATATTC				
36181		TATCATATGT				
36241		GTGCTTCACT				
36301		CGAGCAGAAT				
36361		CGACAGTACG				
36421		TCTTGACATA				
36481		CATCCGGATC				
36541		GCCGTGAATT				
36601		GCGGATTAAA				
36661		GTCGCCACGC				
36721		CGCCATTTAA				
36781		GTGTATTCCA				
36841		CAAACAGTGT				
36901		AAAGGAATTG				
36961	TECATACCEA	TTCTGAACTC	TTGAGTACAG	CTGGCACTTT	CATTGCCAAC	VCCVCCALLAC
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37081		AATCAAGAAC				
37141	TO A LACOT LA	TCAGCCGGAA	AGA ACCOTTO	TAATATTCAT	CATCTTCTAT	CCCACCAGIA
37201		ATTGAGCGAC				
		TACTGTCTTT				
37261		TTCTTCCCGG				
37321		CATCCTTGTG				
37381	IGCCTTAAGG	CATCAGCATA	TTCACGIGAG	CCCAAATCAC	TA A TOTTOTA C	CACCACACACA
37441	CCTTTCGTC	LAICAGCAIA	TIGGICALCC	TCATAATCAG	IMMITICIAL	AMOROMORO
37501	TCGCAGACAT	AACCGAAGGC CAAACGGAAC	TICGICAINA	TONINGICCI	TWOCTTICTL	WICIGICCC
37561						
37621	ATCACAGCAA	CCATCTGGGC	THICCGGIAI	TOCHOWIGIC	TICGCGCAGA	A 1 GG 1 GG 1 G
37681		GCCATCATAT				
37741		TCACCCGCAC				
37801	ATCTTTAGTT	TCAGACTGTT	TOCCOTOTE	CCTCCCCAGCCA	ATATACAGGC	GATTATTCAG
37861	GAAAATGGGG	CGTATCAAAT	TGGGGTCTAC	GCIGCCCAAT	GGCAGGTCAA	TAGGTTTCCA
37921	CTCGCTCCAG	GCATTGGGAG	ATAACGCATC	GGTATCAGGA	TGGCGTATCG	AAAGATTCAG
37981	TGAACGCCAG	TAATATTGGT	ATGGCTGTGT	ACGGGTACGT	CCGACAAAGA	AGAACTTATC
38041	GCGTTTGATG	TTAACACCAT	CIICAIAACC	IGCGATAACT	LICAGGTTAC	TGACATCTTC

Fig.2.

38101	AAAATTATTC	AGATAACCGA	GCACCGCTTG	TTGTACAGAA	TCTTCGGTAA	TITTTCCCTG
38161	ATTAAGGGCA	CTTTCCAGTT	GGAAGAAGAA	TTCTGTTTTA	TTCAGGCGTA	ACAGGGGTTC
	CAGATAGCTT					

N=unspecified base

Fig.3.



INTERNATIONAL SEARCH REPORT

rnational Application No PCT/GB 97/02284

IPC 6	FIGATION OF SUBJECT MATTER A01N63/02 A01N63/00 C12N1/2 63:02,63:00),(A01N63/00,63:00)		//(A01N63/02,			
	o International Patent Classification (IPC) or to both national classific	cation and IPC				
	SEARCHED ocumentation searched (classification system followed by classificat AO1N C12N	ion symbols)				
	tion searched other than minimum documentation to the extent that s					
Electronic d	ata base consulted during the international search (name of data ba	ise and, where practical, search terr	ns used)			
C. DOCUM	ENTS CONSIDERED TO BE RELEVANT					
Category '	Citation of document, with indication, where appropriate, of the rel	evant passages	Relevant to claim No.			
X	WO 95 00647 A (COMMW SCIENT IND RES ORG; SMIGIELSKI ADAM JOSEPH (AU); AKHURST RAY) 5 January 1995 cited in the application 21,5, 13, 18-2 24-26 29,3					
Y	see page 1, line 3 - line 29; claims 10-13 3,4, 6-10,12, 14,27, 28,31					
	-/					
X Furth	ner documents are listed in the continuation of box C.	X Patent family members are	e listed in annex.			
"A" docume consid "E" earlier of filing d "L" docume which crattor "O" docume other r "P" docume later th	int which may throw doubts on priority claim(s) or is cited to establish the publicationdate of another n or other special reason (as specified) ant referring to an oral disclosure, use, exhibition or	"Y" document of particular relevance	ce; the claimed invention ce; the claimed invention c cannot be considered to the document is taken alone ce; the claimed invention ce; the claimed invention ce an inventive step when the e or more other such docu— g obvious to a person skilled c patent family			
1	7 December 1997	14/01/1998				
Name and m	nailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo ni, Fax: (+31-70) 340-3016	Authorized officer Muellners, W				

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INTERNATIONAL SEARCH REPORT

national Application No PCT/G /02284

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Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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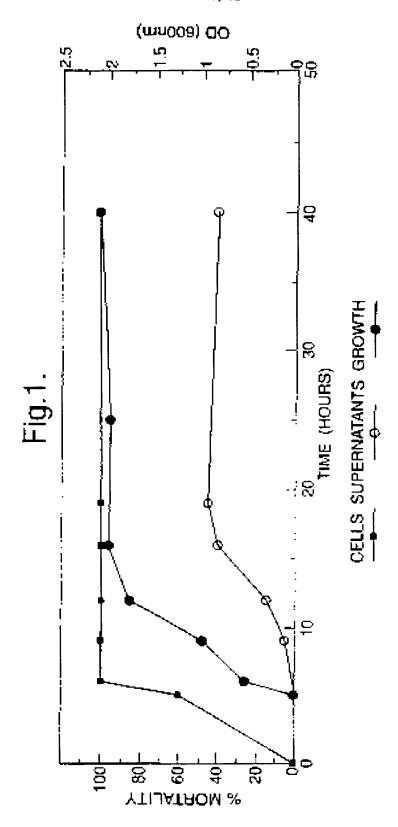
(57) Abstract

A method for killing pests (e.g. insects) comprising administering material from Xenorhabdus species (e.g. X. nematophilus) such as cells or supernatants orally to the pests, either alone or in conjunction with Bacillus thuringiensis or pesticidal materials derived therefrom. Also disclosed is an isolated pesticidal agent (and compositions comprising the same) characterised in that it is obtainable from cultures of X. nematophilus or mutants thereof, has oral pesticidal activity against Pieris brassicae, Pieris rapae and Plutella xylostella, is substantially heat stable to 55 °C, is proteinaceous, acts synergistically with B. thuringiensis cells as an oral pesticide and is substantially resistant to proteolysis by trypsin and proteinase K. DNA encoding pesticidal activity is also disclosed.

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1323	CTCTTCTTC	ATTATAAGTC	CATTTEATGE	AACCACATCG	CCGCAGGACT	TEGGGETACA
1381	CONTROCTED A	AADDOODAGT	GTGAAGAAGE	AAGCCGCTTT	TATCTGGGGT	CTCGASTGTT
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1681	COMPACEDIA	CHOKE & COLOR	Chasaccas	CONVICTOR:	TTGCTTGATG	Tales Control
1741	GAAACTACAG	FOLD THURSDAY AND	ARRONOGAOU.		CARGLALTIC	TITIES CONTROL
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1861	TTCTGTGATT	1WYWT1WY	ACTIVATION :	17VCCGCCCC	GANTINACIT	CCCCCTANACC
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2041	TGTCAGCGAC	GGGGATAATA	CEGIIONCII	WWW.IDI.FUCT	WITE C 10000	CMCC1111N1
2101	TGCCLAAGAA	TATCUCATTO	DICACCACA	COMPLEMENTS:	GAAAAAAGTA	WHAT I GRATIC
2161	ATAAATACAG	GAÇAGGITAT		A I M I C C G C ST	CAAAATGGAG	CHARLITATO
2223	TEAGGGCGCG	AGEACACTAT	TTTAGUTGES	INDAM: ::;	GATTATCTCT	TANTETTUAG
2281	TTTTLATAGT	GTTTTTATCG	AUTGAMAITI	ARTUGUALA CALA	SCAATTCTTT	AURUIJITAT
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2401	TECTOGOGOCO	CTGAGTTTAT	GTRECCETEC	ChCi, all al	TATTGCCTGC	CARTAGATAG
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3121	TAATCCAACG	CCAAAAGTTT	ፐአሮሮጳጳጳጳንዮር	AGAGTTTCTT	CCTGATGCAG	TGATAAATGA
318)	ACCATATCAG	GCATCAATTA	CCATCACAGG	AGGTGCATTG	AATGAAAAAA	OCCTTTGGGT
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6481					TTGATCTGAT	
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6601	ACCEPTACE	ANGCORCANO	ጥርሮሮኔጥፕሮካና	CC Later Contact	CCGGTCCCCT	COMMERCIA
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67 21					CAAATCAGGG	
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7321	ACTGTGTATG	CTTTATUGTT	\$37CGCCC77	CAATGGCAAA	ACAACGGCTT	
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7621	ATCTGGCGTC	ACCAGATATG	GCCCGGTATA	TCCTGTTGTG	GACTGATAAC	CTGCGGCCGG
7681	GCGGCCTGAA	TATOGOOGGA	TITATGATGC	TGGTGCTGAA	AGAGACECTS	
7741	AAAUGACUCA	ACTGGTTCAA	TUTGEEATS	TAATGGCACA	GTTATCGCTT	TCCGTGCAGA
7801 3 667	CACIGCGICI	CASTGAAGCA	GAGCITTCTG	TGCTGGTCAT	TICCGATITI	GTGGTACTGG
7861 7921	ロング ないかいかんかん ウェング いっかい	CCAACCGCCG ATTAATGGGC	GACAACACAA	TATTGATACT	CIGITOTOAC	TCTACCGATT
7981		CACGGGGGAC	TO COMMENTAL COLUMN	TOGETETURE	ACACTGGATA	TGCTGCGCCA
8041	ACGCAGGCCA	TGGGTTCCCG	44STROPPON	TOUSIERIES:	ARTHURA GRANDA	TRUTTE A COC
8101	CETETTECAG	TGGATALATG	TEGEATCAGE	ACTGCTCACT	CATGCCCC	CALL DAY, CALL
8161	CCCTCCTSAA	ተ ል ፖርርር ተ ፕእር	GTGACTGCAT	TAAACAAAGC	CGAGTCGAAT	CTGCCTTGCCC
8221	GGCATAAGTG	GCAGACGCTG	GCAGAAATA	TUGCAGCOGG	ACTGAGTACA	ግሞገንግልባልፋብ
8281	AGAÇGCTGGC	GGRTTATACC	GCAGAGCGCC	TGAGTAACGT	GTTGTGCAAT	TRETTTYTEE
8341	CGAATATCCA	GCCAGAAGGG	GTGTCCCTGC	ACAGCCGGGA	TGACCTGTAC	AGCTATTTCC
8401	TGATTGATAA	TCAGGTCTCT	TETGCCATAA	AAACCACCCG	ACTOGCAGAG	GCCATTGCCC
8461	GTATTCAGCT	CTACATCAAC	CGGGCGCTGA	ACCGGATAGA	GECTAATGCC	CCTGCCGATG
8521	TETCAACCÇG	CCAGTTTTTT	ACCGACTGGA	CGGTGAATAA	CCGTTACAGC	ACCTGGGGGG
8581	GGGTGTCGCG	GCTGGTTTAT	TATCCGGAAA	ATTACATTGA	CCCGACCCAG	CGTATUGGGC
8641	AGACCCGGAT	GATEGATGAA	CIGCIGGAAG	ATATCAGCCA	GAGTCAGCTC	AGCCGGGACA
8701	CONTRACCOCO	GGCCTTTAAA ATCACCGACA	ACTIMENTER	CLUCITICAA	ACCOTGGCAG	ACCTGALAGT
8761 8821	A NO CONSCIOLI	AACCTGCCGG	BUTTERSON	CONTRACTOR	C TOWALL TOWN	JIGICOGUCA
8881	CCCTCAACTC	GCOGCOGATG	CCTCCTACTO	THEGOMESTS	ATTICATE OUT	CCCTCAACCC
8943	ATACAAGGAT	GELATACETC	CGGTCATATT	CAGGGAACT	THEFT	TOTATEMENT
9001	AAAAAGAGGA	AGTGGCGAAA	AATGGTACTG	ATCOGGTGGA	AACCTATGAC	LCG. Legisland Laborator
9061	TGAAACTGGC	CTTTCTGCGT	CATGATGGCA	GTTGGAGTGC	CCCCTGGTCT	TATGATATCA
9121	CALCGCAGGT	GGAGGCGGTC	ACTGACAAAA	AACCTGACAC	TGAACGGCTG	GCGCTGCCCG
91B1	CATCAGGCTT	TCAGGGGGAG	GATACTETEE	TOSTGTTTGT	GTACAAAACC	GGGGTGAGTT
9241	ACCCGGATTT	TGGCGACAAC	AATAAAAAT G	TGGCAGGCAT	GACCATTTAC	GGCGATGGCT
9301	CETTCAAAAA	GATGGAGAAC	ACAGCACTCA	GEGTTACAGE	CAACTGAAAA	ATACCTTTGA
9361	TATCATTCAT	ACTCAAGGCA	ACGACTTGGT	AAGAAAGGCC	ACCTATOGTT	TESCGEAGGA
9421	TTTTGAAGTG	CCTGCCTCGT	TGARTATGGG	Truruccare	GGTGATGATA	GTCTGACGGT
94Bl	UATGGAAAAC UNCCOTRONT	GEGAATATTC	COLAGRAPAC.	DESTRUCTION	TOURGEBATA	ACCTTGCTAT
9541 96Dl	CANACATA	AACGCCGCTT AGCGCCATGA	TONCTO LOCATE	WINIEWICCE	ACTOCCARIL:	TCATCAGAAA
9661	TTTATCATC	CAAATACCGT	TALLIGATION TO THE TALLIGATION OF THE TALLIGATION O	CCCCCTTBCT	CTC STITUTES.	CCCCCCCCCC
9721	VILLELLING TO THE PROPERTY OF	TTAAAACGGA	AABACTATAT	TECATCACTT	CARCCIOSS	COUNTY PORTS
9781	AGATTACACT	AGGCGTTTGA	TTCTAACACC	AGTTGAAAAT	AATTATTATG	CCACACTICAT
9841	CGAGTTTCCA	TTTTCTCCAA	ACACAATTTT	AAACACÇÇTT	TTCACGGTTG	GTAGEAATAA
9901	AACCAGTGAT	TTTAAAAAGT	GCAGTTATGC	TGTTGATGGT	AATAATTCTC	AGGGCTTCCA
9961	CATATTTACT	TCCTATCAAT	CATCCCCCTG	GCTGGATATT	GACACAGGTA	TTAACAATAC
10021	TGATGTÇAKA	ATTACGGTGG	TACCTGGCAG	TAAAACCCAC	ACCTTTACGG	CCAGTGACCA
10081	TATTGCTTCC	TTGCCGGCAA	ACAGTITICA	TGCTATGCCG	TACACCTTTA	A GCCACTGGA
10141	AATCGATGCT	TCATCGTTGG	CCTTTAECAA	TAATATTGCT	CCTCTGGATA	TCGTTT7TGA
10201	GACCARAGEC	AAAGACGGGC	GAGITACIGUG	TRAGATUARG	CAAACATTAT	CGGTGAAACG
10261 10321	GUINAATIAT	AATCOGGAAG GGGGTGTATC	ቝዹኯ <i>ፙፙዀ</i> ፚፙፙ ቔ፞፞ዀ፝ቔቔቔቔዀኯፙፚኯ	TO TOUGHT ARE	AUTUATIONS -	GTGCCCAATA
10381	TWIGGMOOTE	ACGGGCATTG	PARTICULA PARTICULA	CACAATCCAA	アルログラングへしている	ARCTGGTATE
		GAAGGCTTCT	THEIR STATE	TOTAL PROPERTY OF THE PROPERTY	BBBTSTCBC1	TWO DOWN DOWN
10501	TESTSATUAG	CGGTGGTTTA	AAATCCATAT	CGGGAATGTT	GGCGGTAACA	COCCIONAL A
10561	GESTTATTAE	AGCGGAATGT	TATCCGATAC	GTCGGAAACC	AGTATGAÇAC	TCTTTCTCCC
10621	TTATGCCGAA	GGGTATTACA	TGCATGAAGG	TUTCAGATIG	GGGGTTGSAT	ACCAGAAAAT
10681	TACCTATGAC	AACACTTGGG	AATCTGCTTT	CTTTTATTTT	GATGAGACAA	AACAGCAATT
10741	7GTATTAATT	aacgatgctg -	እፕሮእ ፻ፍልፕፕሮ	AGGAATGAÇG	CAACAGGGGA	TEGTGAAAAA
10801	TATCAAGAAA	TACAAAGGAT	TETTAKETETT	TTCTATCGCA	ACCECTATT	CCSCCCCGAT
10861	GGATTTCAAT	AGTGCCAGCG	CCCTCTATTA	CTGGGAATGT	TCTATTACAC	CCCGATGATG
10921	TGCTTCCAGC	GTTTGCTACA	GGAAAAACAA	TTCGACGAAG	CCACACAATG	Gatabactac
10981	GTCTATANTC	CCGCCGGCTA	TATOGITAAC	GGAGAAATCG	CCCCCTGGAT	CTGGAACTGC
11041	CGGGCGCTGG	AAGAGACACT	CUTEGAATEC	CAATCEGTTG	GATGCCATTG	ATCCGGATGC
11101 11161	LG_UGCACAA hC──hH C CACAA	TATGACCOGA CGCGGCGATA	LACTATAA Walantara	MOTIGCEACE MEXICANIA	TTTATECECC	TGTTGGATCA
***07	ACT MITTIG	COCOCOMIN	TOUR PATTER	CONNC 10HCC	Collegit Marse	IGAATGAAGE

		TATGTGCGTG		0000000000	C3000000x00	1. Bath 4000000
11221	CAAGATGTGG	TATGTGUGIU	CTTTGGAGTT	GCIGGGIGKI	なれるとこれがもなり	ATTACEGUAG
112B1	CCAACAGTGG	GCCGCACCGT	CTCTTTCCGT	CHARLESTER	CACALIGIGE	AAGUEGGCTA
11341	TCAACAAGAC	CTTACGGOGC	TAGACAACGG	AGAAGGTTGC	ACTEARCEEC	GCAACGCTAA
11401	CANCILLIA CALL	GTTTGGTCCT	CCCCCANTAT	AACCCGGAAT	ATTAECCIATTA	CTEGERARCE
	magamenta.	CCTGGTTAAC	CANCAS LALAY AN	עיין יון יוידידין ייניע א	CACCCCCAAC	COMPANICATION
11461	1GOS111GCG	CCIGGIIANC	CIGGGCCVIC	VIACATE CONT.		
1152)	GGCGAATIAC	GCGAGCCTAC	GATUUGAAAG	CGCIGCIGAG	CAGIAIGGIA	CHOCKIIC
11581	agggcggtag	TGCAGTGCTG	CCCGGCACAT	TGTCGTTATA	CCCCTTCCCG	GIGATGCIGG
11647	AGCGGGCCCG	CAATCTGGTA	GCGCAATTAA	CCCAGTTOGG	CACCTCTCTC	CTCAGTATGG
	でもなるののもできる	TGATGCCGAT	GRECTCACCA	CGTTGCTACT	ACAGCAGGGT	ATGGAACTGG
11701		CATCCCTATT	Chech heesa	CTCTYTCETTCE	A CONTRACTOR	CATATIONSCINS
11761	COACACAGAG	CWIFCGIWII		THE PROPERTY OF	**************************************	CACCIGIATE
11821	TATTGGCAGA	GASCCSCOGC	AGTGUACHAA	ATCUTCTODA	WWWTACTER	
11881	JOGAGGATAT	CAACCACGGA	GAAÇAGÇGTG	CGATGTCACT	GITTGATGEG	GCGGCAGGTC
11941	አርምሮምሮፕ ርናር	CCGGCAGGCG	CTETEAGTAG	CAGAAGGGGT	GGCTGACTTA	GTTCCAAACG
	STORY VICTOR	CCCTTGTGGC	COCACTCCTT	GGGGGGGAGC	ACTRICRITECT	TEEBEETEEG
12001	1011230211	TTCTGCCACA	COMPCCATA	ATTECOCAGA	Charter	CGTTCGGAAG
12061	JGA JG JCGET	TILIGHLACA	Cotton Commit	MII CEGENGA	THE PROPERTY OF THE PARTY OF TH	
12121	CCTACCGCCC	CCGCCGTCAG	GAGTGGGAAL	TYCAGOSTGA	TARIGCTUAL	GGTGAAGTCA
12161	AACAAATGGA	TGCCCAGCTG	GAAAGCCTGA	AAATACGCGG	CGAAGCAGCA	CAGATGCAGG
12241	TOBBETATOR	GGAGACCCAG	CAGGCCCATA	CTCAGGCTCA	GTTAGAGCTG	TTACAGCGTA
	**********	CAAAGCGCTT	ጥልሮስርምማርያው	TOOTOGOLA	GETGAGTGCT	ATETATTACC
12301	MAY 1 CHEMIN	CCTGACCCAG	THE STANSON	TENTERCACA	COLLOCATOR	
12361	ACTICTICA		TOCTICION'S	TOKIGO	CANDOCALIO	# **** ********************************
12421	TGACCGACAA	COGTGTTACC	TTTATUCGGG	GIBBBBBCLII	GANGLAGIACE	ACTGCGGGTT
12481	TGATGGCGGG	TGAAACGTTG	CTGCTGAATC	TUUCAGAAAT	GGAAAAAGTÇ	TEGCTGGAGC
12541	CTCATCAGCG	GGCACTGGAA	GTGACCCGTA	CCGTCTCGTT	GGCAÇAGTTÇ	TATCAGGCCT
	PARCATENES.	CAACTITAAT	CHYCACCEAAA	BACTCACTCA	ATTICTECST	GAAGGGAAAG
12601	JAICAICAGA	AGCTTCCGGC	*********	አአርምሮአርሞልአ	CCCCCACATA	CARCCCTCAG
12661	GUAAUGTAGG		MAIGANII AA	AND ANALOS		NAME OF COMP
12721	ŢĢÇĠŇŦŦĠŦĊ	TGATTTGAAA	ATTITUAGEG	ATACCCCGGA	AAGC111GGC	AMINGCOSIC
12781	AGTTGAAACA	AGTGAGTGTC	YCCLLCCCC	CGCTGGTTGG	TUOGTATGAA	GATATCUSSU
12841	CGGTGCTGAA	TTACGGCGGC	AGCATOGTCA	TGCCACGCGG	TIGCAGIGCT	ATTGCTCTCT
12901	CCCNOSCOST	GAATGACAGT	GGTCAATTTA	TGCTGGATTT	CARCGATTCC	COTTATCTCC
	CCDICORECT	TATTTCCGTG	DATEACAGER	REACCOMMAC	GTTGAGTTTC	COGGATGOGA
12961	CGLIACANOO	GAAAGCGCTG	MACCO CONTRACTOR	TOACCOATAT	CAMPRICACO	a modelicoma ma
13021	CTGATUGAUA	GAARGUGUTU	LICENCIAC.	TONGCONING	CWITCIGENI	MITTERIA
13081	CCATTEGTTC	AAAATTAAAT	CATTGTGATA	GGCAGGGTCT	TOMOGRAPHIC	TOTT TANGGA
13141	GTTTTTATGC	AGGGTTCAAC	ACCTTTGAAA	CTTGAAATAC	CGTCATTGCC	CTCTGGGGGGC
13201	CCSTCSCTAR	AAGGAATGEG	AGAAGCACTC	AATGCCGTCG	GAGCGGAAGG	GGAGCGTCAT
		CTTGCCGATC	TOTATOCCC	CTCCTCTCCT	GCCGSTGCTA	TCACTGAATT
13261			PROTECTION.	CONTRACTOR	GCAATGTGGG	Talanta Calabatan P
13321	acagcagtac	TGCIGGCAAI	GROUP CHILLS	20M1000010	10110100	THE REPORT OF AN
13361	TCAGCCTGCG	TACCGCCAAG	GGCGTTCCGC	ALTATACGGG	ACAAGATGAG	TATCICGGGC
13461	CGGATGOGGA	AGTGTTGAGT	ATTGTGCCGG	ACAGCCAAGG	GCAACCAGAG	CAACUCACCA
13501	CARCETCACT	GTTGGGGACG	GTTCTGACAC	AGÇÇĞÇÇTAÇ	TGTTACCCGC	TATCAGTOCC
	CCCTCCCACA	AAAAATCGTT	DOTTTAGAAC	ACTOGCAGCC	ACAGCAGAGA	CGTGAGGAAG
13561		للملت الملت التاليات	والتارا تاللما لاطماعات	TOGETHEROM	GCACCTATTC	GGTAAGCATC
13521	AGACGICIT	1100014611	4447644666	22200000000000000000000000000000000000	TGCCCGCTGG	CHICATIONICS
13681	ATCATGCACG	TATIGETGAL	CEGEMOGNIC	ANACCAGRAT	######################################	
13741	AAACCGTCAC	GCATACCGGG	GARCATATIT	ACTATCACTA	TCGGGCAGAA	
13801	AUTGTGATGA	GCATGAACTT	GCTCAGCATT	CAGGTGTTAÇ	GGCCCACCGT	
13861	ክርተነተር አርማልጥ	GGCAATACTC	AGCCGGAAAC	CGCTTTTTTC	GOGGTAAAAT	CAGGTATCCC
	WOLF CONTRACT	GACTGGTTGT	STATE ACARACT	አጥተባር አጥም አጥ	COTCAGOGOT	TATCTTOGCT
13921	ICITEMINAL	CCCGAATTCA	AMCHOOLOGI	DESCRIPTION	מיעמת התבעוצעד	ልማርተርተርተር
73587	GAACTECGTA	CCCGMATTCA	WIGHTOT CHOR	WANTED TO	AND THE PROPERTY OF THE PARTY O	PARMACACE NO.
14041	AAAATGGCGT	TGTCGTCCGG	ACACTITUTE	CCGCTATGAA	TAYGGGTTJG	ARATICOARC
14101	CCGTCGCTTO	TGTCGCCAAG	TTCTGATGTT	TCATCAGCTG	ARAGUGUTGG	ممممناناتهام
14161	<u>ರಭಗಳಗಳಿಗಾಗಿತಿತಿ</u>	GARACACCGG	CGCTGGTTTC	CCGTCTTATT	CTGGATTATG	ACCTGAACAA
14221	CARCOTTOCC	TTGCTGCAAA	CGGCCCCCCAG	ACTGGCCCAT	GRAACGGACG	GTACGCCAGT
		CCGCTGGAAA	TYCESTERTED	TEATTSTENA	CATGGCGTGA	ATCTGAACTG
14281	GATGATGTCC	CCGCAGTTAG	10041141	C. COTTO	CCDOSCODO	CONTRACTOR AND THE
14341	GCASTCCATG	CCGUAGITAG	AMMANA INSAM	DATA 1 12 DAG	COMMONWE	1221173111
14401	ATATEGAGAA	GGARTITCCG	GCGTTACTTT	ATCAGGATAC	TCAGAAAGCC	TGGTGGTALL
14461	CTC CTC CYGGT	ACGGGATATC	ACTGCCGAAG	GAACGAATCC	GGTTACCTAT	GAGGAGGCGA
14521	A NOUNCEMENT CONT	ኔሮ እምልሞ ፕ ኖርና	GEACAACAGG	AAAGCGCGAT	GTTGTTGGAC	ATCAATGGTG
		GGATTGGGTG	TALISTA	CAGGGTTACC	GGGCTACCAC	ACCATGTCAC
14581	ACCORDED TO THE	ATGGACACCC	The supplication of the su	שניאברקין קלע פער	なかであれずでである。	ሚያ ባማም የሰው ውጥ
14641	CGGAAGGTVA	A IGHINCHU	11191[172]	10100000000000000000000000000000000000		TWITTIC/WIF
14701	CGCAGGCAAA	ACTGGCTGAT	ATIGATGGGG	C1000CTGCC	IGACTTAGEG	CTIMIUGGGC
14761	Caratagtgt	ACGTGTCTGG	TCAAATAATC	CESCAGGATG	GGATCGCGCT	CAGGATGTTA
14821	THE STREET STORE	AAATAAGCCA	CTGCCGGTTC	CCGGCAAAAA	TAAGCGTCAT	CTTGTCGCAT
14881	ጥሮኒያምርኒኒፕሬፕ	GACAGGCTCC	GGGCAATCAC	ATCTGGTGGA	AGTTACGGCA	AATAGCGTGC
	CARGAMANA A	GAACCIGGGG	TALLEGERAL	TIGGTGAGCC	TCTGATGATA	ACAGGETTEE
14941	GCIACIBODE	GAAACGTTTA	TO TOWNS AND A	יער איד איד אידין א	ርጥይር እርት ተን	ልጥ/20 <u>የምር</u> አርሱ
15001	AAATTAUUUU	OWNICO LITA	يون المرابع ال	**************************************	○13446年1422	" I TOOL I CHOC

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15061	CARCACCCGA	ידי עיידידים פיוידידים	ACCCCC ATA	<u>የምምል</u> ሲኖምቸና ኢ	ACTOTATECO	AATGARAGCG
15121	GCAATCATTC	TGUTTALCUT	ביים ביים ביים	ATCTGCCGGA	TGGGGTACGT	TITGATGATA
15181	CINSTOGGIT	ACAAATAGEG	GATACACAAG	GATTAGGGAC	TOCCAGCATT	ATTTTGACGA
15241	TOCCCCATAT	GAAGGTGCAG	CACTEGOGAT	TGGATATGAC	CATATTCAAG	CCTTGGCTGC
25301	TGAATGCCGT	CARTARCART	ATGGGAACAG	AAACCACGCT	GTATTATCGC	AGCTCTGCCC
15361	AGTTCTGGCT	GGATGAGAAA	TTACAGGCTT	CTGAATCCGG	GATGACGGTG	GTCAGCTACT
15421	TACCOTTCCC	GGTGCATGTG	TTGTGGCGCA	CGGAAGTGCT	GGATGAAATT	TCCGGTAACC
15481	GATTGACCAG	CCATTATCAT	TACTCACATG	GTGCCTGGGA	TEGTETEGAA	CGGGAGTTTC
15541	GTGGT7TTGG	GCGCGTGACG	CARACTGATA	TIGATICACG	GGCGAGTGCG	ACACAGGGGA
15601					GTACGGCACT	
15661					TCAACAGGCA	
15721	TTACCCCACG	CTTTACCCGT	TATGACGAAA	AATCCGGTGG	TGATATGACG	GTCACGCCGA
15781					ACAACGTTTA	
15841	TGTATGGGGA	TGATGATTCT	ATACTGGCCG	GTACGCCTTA	TTCAGTGGAT	GAATCCCGCA
15901	CCCAAGTACG	TTTGTTACCG	CTCATCCTAT	CGGACGTGCC	TGCGGTACTG	GTTTCGGTGG
15961	CCGARTCCCG	CCAATACCGA	TATGAAGGGG	TTGTTACCGA	TTCCACAGTG	CAGCCAAAAG
16021	ATTGTCCTTA	AATATGATGC	GTTAGGATTT	CCCCAGGACA	ATCITGAGAT	TGCCTATTCG
160B1	AGACGTECAC	AGCCTGAGTT	CTCGCCTTAT	CCGGATACCC	TGCCCGAAAC	ACTITITEACC
16141	AGCAGTTTCG	ACCAACACCA	GATGTTCCTT	CGTCTGACAC	GCCAGCGTTT	TTCTTATCAC
16201	CATCTGAATC	ATGATGATAA	TACGTGGATC	ACAGGGCTTA	TGGATACCTC	ACCCACTGAC
16261	GCACGTATTT	ATCARGEEGA	TAAAGTGCUG	GAUGGTGGAT	TITOCCTICA	ATGGTTTTCT
16321	GCCACAGGTG	CAGGAGCATT	CTTGTTGCCT	GATGECGCAG	CCCATTATCT	GGGACATCAG
16381	CGTGTAGCAT	ATACCGGTCC	AGAAGAGCAA	CCCCCTATTC	CTCCGCTGGT	GGCATACATT
16441	GALACESCAS	AGTTTGATGA	ACCATOCTTC	OCCGCTTTTG	AGGAGGTGAT	GGATGAGCAG
16501	GAGETGACAA	AACASCTGAA	TGATGCGGGC	TGGAATADGG	CAAAAGTGCC	GTTCAGTGAA
16561	AAGACAGATT	TCCATGTCTG	GGTGGGACAA	AAGGAATTTA	CAGAATATGC	CGGTGCAGAC
16621	GGATTCTATC	GSCCATTGGT	GÇAAÇGGGAA	ACCAAGCTTA	CAGGTCAAAC	GACAGTGACG
16681	TGGGATAGCC	ATTACTGTGT	TATCACCGCA	ACAGAGGATG	CGGCTGGCCT	GCGTATGCAA
16741	GCGCATTADG	ATTATCGATT	TATEGTTGCC	GATAACACCA	CAGATATCAA	TGATAACTAT
16801	CACACCGTGA	CGTTTGATGC	ACTGGGGACG	GTAACCACCT	TCCGTTTCIG	GGGGACTGAA
16861	AACGGTGAAA	AACAAGGATA	TACCCCTGCG	GAMAATGAAA	CIGICCCCIT	TATTGTCCCC
16921	ACAACGGTGG	ATGATGCTCT	GGCATTGAJA	CEESGEATAC	CTGTTGCAGG	GCTGATGGTT
16981	TATSCCCCTC	TGAGCTGGAT	GGTTCAGGCC	AGETTTTCTA	ATGATGGGGA	GCTTTATGGA
17043	CAGGTGAAAC	CCCCTGGGAT	CATCACTGAA	GATGSTTATC	TOCTGTCGCT	TGCTTTTCGC
17101	COCTOCONTO	AAAATAACCC	TGCCGCTGCC	ATSCENANGS:	AAGTCAATTC	ACAGAACCCA
17161	ECECATGTAC	TERETETEAT	CACCGACCGC	TATGATGCCG	ATCCGGAACA	ACAATTACGT
17221	CANACCTTTA	CGTTTAGTGA	TESTITTESS	CONVICTION.	CAAACAGCCG	TACGCCATGA
17281	AAGTGGTGAA	GCCTGGGTAC	CTCATGAGTA	TAADOCKART	GTGGCTGAAA	ATEXAGGEGE
17341	CCCTGAAACG	GGCGATTACA	AATTTCCCCT	TGGGGCAATTT	CCCGGACGTA	CAGAATATTA
17401	ACGGGAAAAG	GCAAAGCCCC	TECGTTACGT	TTUNNACCUT	ATTCCTGAAA	TAATTTGGGC
17461	AACTATGTCA	AGTTGACCAA	CCCCCAAAA	GCAGGATATG	TATGCCGATA	CECATTACTA
17521	TGATCCGTTG	GGGCGTGAAT	ATCAGGTTAT	CACCCCAAAG	GCGGGTTGCG	TCGATCCTTA
17581	TTCACTCCCT	GGTTTGTGGT	GAATGAAGTT	AJABTAAAB	CTCCCGGTGA	atgacagcat
17641	AAAGCTCAGT	GATGCCTGTT	CACTGAACAG	ACATCACTOC	ATTTAGGAAT	GAATCATGAA
27702	GALTITOGIT	CACAGCAATA	CGCCATCCCT	CACCCTACTC	GACAACCGTG	GTCAGACAGT
17761	ACCCGAAATA	GCCTGGTATC	GGCACCCCGA	TACACCTCAG	GTAACCGATG	AACGCATCAC
17821	CGGTTATCAA	TATGATGCTC	AAGGATCTCT	GACTCAGAGT	ATTGATCCGC	GATTTTATGA
17881	ACGCCAGCAG	ACAGCGAGTG	ACAAGAACGC	CATTACACCC	AATCITATTC	TCTTGTCATC
17941	ACTCAGTAAG	AAGGCATTGC	GTACGCAAAG	TOTGGATGCC	GGAACCCGTG	TOGOCOTOCA
18001	TGATGTTGCC	GGGCGTCCCG	TITTAGCTCT	CAGCECCAAT	GGCGTTAGCC	GAACGTTTCA
18061	GTATGAAAGT	GATAACCTTC	CGGGACGATT	GCTAACGATT	ACCGAGCAGG	TAAAAGGAGA
16121	GAACGCCTGT	ATCACGGAGC	GATTGATTTG	GTCAGGAAAT	ACGCCGGCAG	AAAAAGGCAA
18181	TAATTTGGCC	GCCCASTGCG	TGGTCCATTA	TGATCCCACC	GGAATGAATC	AAACCAACAG
18241	CATATIGITA	ACCAGCATAC	CUTTGTCCAT	CACACAGCAA	TTAGTGAAAG	ATGACAGCGA
18301	AGCEGATTGG	CACGGTATGG	ATGAATTTGG	CTGGAAAAAC	<u>GCGCTGGCGC</u>	CGGAAAGCTT
18361	CACTTCTGTC	AGCACAACGG	ATGCTACCGG	CACGGTATTA	ACGAGTACAG	ATGCTGCCGG
18421	AAACAAGCAA	CUTATOGCUT	ATGATGTGGC	CGGTCTGCTT	CAAGGCAGTT	GGTTGGCGCT
1 84 6 1	GAAGGGGAAA	CAAGAACAAG	TTATCETGAA	ATCCCTGACC	TATTCGCCTG	CCAGCCAGAA
18541	GCTACGGGAG	GAACATGGTA	ACCOGATAGT	GACTACATAT	ACCTATGAAC	CCGAGAÇGÇA
18601	ACGAGTTATT	GGCATAAAAA	CAGRADGTCC	TTCCGGTCAT	GCCGCTGGGG	<u></u> ልGአልልያቸገገጉ
18661	ACAAAACCTG	CGTTATGAAT	ATGATECTGT	CCGAAATGTG	CTGAAATCAA	CTAATGATGC
18721	TGAJIATTACC	CCCTTTTCGC	GCAACCAGAA	AATTGTACCG	GARARTACTT	acacetatga
18781	CAGCCTGTAC	CAGCTGGTTT	CCGTCACTGG	GCGTGAAATG	GCGAATATIG	gccgacaaaa
18641	AAACCAGTTA	CCCATCCCCG	CYCTGATYGA	TANCARTACT	TATACGAATT	ACTOTOGORO

189Di	TTACGACTAT	GATOGTOGGO	GARTCTGACC	AGAATCGCAT	AATTCACGAT	CACCGGTAAT
18961	AACTATACAA		CGTTTCAGAT	CACAGCAACC	GGGCTGTACT	GGAAGAGCTG
19022	GCCCAAGATC		GGATATGTTG	TTEACCCCCG	GCGGGCATCA	GACCCGGCTT
19081		AGGATETTTT		CGTGACGAAT		
19141	AATAGGGAAA				ATGATGCAGA	CAGTCAGCGT
19201		CTCATATTCA				
19261	TTGCCAGAGC		CACGACATAT			
19321	GTCATCACTG		GGGTCAGGCA			
19361	AAACCGGCGG		TGATCAGCTG		ATGGCAACCT	
19441		AATTGGGACA				ATTACCCCTA
19501	TGGGGGAACC		CACCCGAAAT	CAGTCAGAAG	CTUATTACAC	AAGCCGGCGT
19561	TATTCTGGCA	AAGAGCGGGA	TGCAACAGGG	TIGINITACT	ACGCCTATCC	TTATIATCAA
1962)	TEGTGGACAG		GAGTGTAGAT	CCTGCCGGTG	AGGCCGATGG	TCTCAATTIG
19681	TICCGAAIGT	GCAGGAATAA	CCCCATOGTT	TTTTCTGATT	CTGATGGTCG	TTTCCCCCGT
19743	CAGGGTGTCC	TTGCCTGGAT	agggaaaaa	GCGTATCGAA	AGGCAGTCAA	CATCACGACA
19801	GAACACCTGC		CGCTTCCTTT			
19861	CGAACGTTTG	TITIGGSTGT	GGGGGTACAA	GTCTGGGGGT	GAAGOGGCCA	CGATTGCAGG
19921	AGCGTCGCCT		TCGGGGCTGC			GGGCGGTGAT
1992)	GGGGTTTTTC		TCTCAGAAAA		للماجاة فيليليان	ATCTCACGCC
20041	TARACGTICT				ACATOGOTTG	TGACGTCTGC
20101	ACTATITAAC		CAGGTACCGC			TEACEGITEG
20151	AGGATTAATG		GAGAACATAA			TTGCCACACC
			ATACGETEAG			CAGAGCGGTT
2032)	EGCCGGACAA	CAGGCGCAAT			GCCGCCATCA	
20281	AGGGCACTAT					
2034)	GAGCTGGGTG		GATTGGTCCT			AAGGATCATT
20401	GGTAATCTAT					AAGAGGCATT
20461	AGETETGECA		TGTCAGTTCC			GATAGGAGAA
20521	AGTGTCGGGA		TGAAGTATTA			CECTEDATES
20581	GTTGGTGCAG		GACAGCCGCS			AGGGGAAGTT
20641	GCCAATGCCG		TACCTGGAGC			TAACTTCTTC
20701	TTTLACGCCT		TAATGAATCC			ATTCCCACTT
20761	TOTCATGGAT		GTTTTTCGGA			
20221	GTCCAGTTAA		TAKODKKDKA			TGATATCGCT
30887	CAGGGTGAGC		TCTGTTTACC		GGAAAACTGA	GGGTTAATGT
20941	GCCTGTATCG	• • •	GCCCTTUTAL.		TTAGCATCAT	
21001	CTGGAATTGA	CCACTGTCAT			ATCGCTTTGC	
21061	CATCATTGTA		AACTEXOTAT			
21121	GGCAGGTAAC		TTTGTTTGAT			CGTCAGGATA
211B1	ATCCCTAGCA	ATATTCAGAT	CCGATAATTT	GAGGCTGGCT	TGCAGTTGTG	TCCCTTCGAC
21243	GTTCAAACCG	TTAAGCGTTG	TECCTGEACT		GCATTGACTA	ACTCAGTCAC
21301	TTTATCTTTT	AAAATGAA AC	<i>îatittțt</i> et	CAGACCAGCA		CCAGAGAAAC
21361	GGTTCTGGTG	ACCTCCAGTS:	CCCCTTCATC	TTTTTCCAAA	TAGCITITIT	CCATCTGTGC
21421	TARATTCAGE	ATCAGGGTTT	CACCCCCTAA	ዮአአአርሮርርርር እ	TRAGTECEAT	GCEAAGCACE
22481	TGGTTTAATA	AAGTGTGCTG	CCCCATTATT	CATACTTRAC	TGATAAGTTT	GCTCTGCCAT
21543	TARACAGAGT	GAGACCGCCA	AATCATAAAA			
21601	GAGCCAGTTG	TATAGEGETS	CATTACTGAA	TTTACTTTGC	AGAAAGGCTA	ACTGCGCCTG
21661	AGTITGTGCC	TGCTGAGTTT	CCAGATAGTT	TTTTTGTAAT	ACTGCCGCTT	CACGARGTAC
21721	ACCCAGCOTC	GCTAATTGAG	CATCAATTYC	TTTTATCTCA	GCTTCCGCAT	TATTGCCCCTG
21781	AATTTCCCAC					
21841	AATACGTGTT					
21901	ALAACGGGAA	CONTRACAG	CARRECCETA	PERMITATE	ALCOPORTUGE	CCCCCCCCCCC
21961	GGCCATATGC					
22021	CSCTTGTTTT					
•	AGACTGTGCA	ACMOCHOCO A			TO A CONTRACT OF	TOTOLOGICO
22081	GACCTTATCC	CONTONOUS P	TITETTOWNG	CCCCAATTIA	TORGUM TUMB	TITUMOUCH)
	TTCAGCCAAG					
22201	TICAGCCARG		2010000110	TTCCDCD DDC	ACCARACTAT	TOCCAARTIG
22261	TATCAACTGG					
22321	CATCACTGCA					
22381	CATGGACGGA	TO TO CONTRACT	AGRACATION A	MONTANTUKC -	MGTGGCTTGRE MCOOLONE	CGTCGATTGT
22441	CASSTTATES	CGTARGTTAT	ACAGGGGTTG	TENERATUTE -	TGCCAGTAAC	CITECAGTTT
22501	TTAATTATTT	TGAGUGAGGA	ACAATGCGGT	I MALYSAAATT	TOCCUTACET	TTCGTGGGTA
77561	ATGCAGCGCG	CIGACECAGT	THUALCATTT	TATGTTGATA	ATGATGCCCC	ATTGTTTGGC
22621	TGGCAGCTTC	TTCCAGCCGT	GECTETGACC	AATCOTTATC	CANTGRARRA	Taaggeteat
226ê)	CACCCAATAA	AGTGAGCGCT	TETACATAÇÇ	ACATTTTAGC	TTOCTTTALG	GTATCACGTT

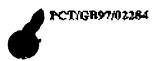


	9					
22741	CARGCTOGCG	ATAGGCGCTA	TCTCCGCGGGG	TARTCRACAA	ATCCAGCATT	TTCATAAAGG
22801	TAGECACTIT	ATAGTEÇATÇ	GGATC ATGET	GGGCAACGGC	GTCCGGATCG	ACCORATOCA
22861	GCGGATTGGE	ATTUCAGGAC	GTATCTTCCT	CCAATGGGCG	GACGTTECAG	TAXTARTOCT
22921 22981	######################################	CIGHACCIDAR	TATECCGGTCG	GGTTCAGATA TGGAATACCA	TAUCGEAGEC	ACCOTOTOGA
23041	LECOSTANAN	1612616113		GTTTGAAATC	TURTUGGUST	TETAATAGAA
23101	TCATGACACG	ACTIGATION		TITTTTGATA	CATGGGTTCH	GIGITATIT
23161	TGTCATTCCC	GAATCATGAT	CGGCATCATT	AGTGAATATA	AATTIATT	ብር ሲያ ተመደ ነው። 1 ተርዕ ነው
23221	AAAATAAAAG	AAAGCAGATT	CCCAGGATTT	GTCATAGATA	ATTITITIET	ACCCAACCCC
23261	TARTCTGACA	CCTTCACGTA	TGTAATATCC	TITAGCATAG	GGAACAAAGA	GEGTTACTGT
23341	GGTTTCAATA	TCAGATAACA	TICCITCGTA	ATAAGGTTGT	CTGGCABAAT	TGCCATCAAT
23401	ATTECEAATA	TGGATCTTAA	ACCAACGTTC	ATCACCATGC	TOUTCTTTAT	TOTAGGGGGG
23461	CAACTTAAAT	GTEGCATAAA	ACCETTCACE	TAATTGCGGC	TCTGGTAAAT	
23521	CATACTTAAA	ACATTATCAA	TACCARTATT	GGCTCTTTCA	GCTAATTTTC	TGGAAAATAA
23581	AGTATTTAAC	CGGGTTCTGT	AAUGUCCAAT	CTGCATATAT	TGTGTGCCTG	ATEGEATITIT
23641	AIGCACIGAT	#TRACGITAC	TIGIATOTIT	GGATTTTAGT TYGETTAATA	TTIRTATGAA	TTGGOGATTC
23701 23761	BAIRACARIA	CCTTCNATAT	COCCOTCEGG	TTGATTAAAA	TARACTUGU PORTA	TCACCAGAGG
23821	TYPETERSAL	CONTRACTOR OF THE	CCACATATAC	TTCAGCATTT	D S CTYCYS CTY	TAISIST TAIGA
23881	GCCATTTTTT	AATAAAAAAC	TAATGTTTTT	ATCTTGGATC	TOTTOGATO	TERMINERAGE
23941	AAGTTTTATT	ATCTGTGGCT	GGTTGAACAT	AAATACACCC	ATGGATCCTC	GERANGGANC
24001	AGTGCCGCAA	TATTTCCCAT	GTTATTAATG	ATTGAAACAT	CATTAGTAAA	TGATTCACAT
24061	ATASTATGCC	ATACTCCTGT	GITATCTTTC	CAATCTAATA	CTATGTTAGT	ATCARGTTTS
24131	AATTCAGCAT	CATCIGATIC	ATAATCATAA	TTTATACCAA	CTCCAATTTC	TGATITTCTA
24181	GGARTITTTT	CCTTGGTTCT	TAGATGCATT	AACACTCTAA	AATATTOGGC	ATTTTTAAGA
24241	TCGATGGAAA	TAATAAAATC	CAAAGTTCCA	TAATGAAAAA	CLICALCALC	TTTTCCAAGC
24301	ATTTCATCAT	GTCTATCATA	ATCAGATAGA	ATAACCGTTT	CATCTTETAC	CATCGATAAC
24361	ACCIATIZA POCA NOCERNA	CCTCSTCSTI	ATATATATAT	CCTTTTGAAA GGTGATATAT	ARTTAATTTC	CATTGAAGGA
24921 24481	CCCCTABAAC	TODAY AND THE	Majajalajajadakādajādajā Mitoritoritoritoritoritoritoritoritoritor	GTTATAGATT	CCTTATATAT	AAAAATATTT
24541	TETETAGEA	TALE TALE TALE	Chulting	TOTGTOCTOG	TATELATER	TO BE BETTER
24601	CTCTTARCAR	TEGUSTUTAA	ATCATTTCT	GTGAGAATGG	እምስ አተ ርተርጉለተ	ስተርክ/ያር/ያጥተኔ
24661	ATGGTCATUC	CTTCTCTTGC	AGGAAGACTA	TTAAAAGAAT	ANTIGICTIT	TITECTCATEG
24721	AAATAAACAA	TAATGACGTC	TTTTTCATAA	TCACAAGAAC	AATACATACC	AATGUTGGUT
24781	TITTTATTGA	TCAGGTTTTC	TATTTTATCA	GTCACATTAA	AATTAAACGG	TGAGCTCCAG
24841	CTGCCATCAT	AACGAATATG	TGACAGTTTT	LATATATAAT	CAGTGATATC	TATOTTGCCA
2490)	TCTTCACTTT	CATTTTTCAG	CACITATIAGA	TOCAGOCACA	KA JĄTAARTĖ	ACGAGACTTG
24961	TAAATAACAG	GTCTGATATT	TTCCTGCCAT	ACATTGATGG	GTATTTCAAT	TITTITTCCAT
25021	TCTCCCCAGG	CATTEGCAGC	AAATTGACEG	TGCTGGCACT	TITEGIGATE	GACATTGCGC
25081 25141	LAATAATATA	TICIOSSITIC	TETCHESCHA	TAACCAATTA	AATAAGTGAG	CECCTCATTG
25201				ACCTGCAAGT GTATCGATAT		
25261				TGACCAATAC		TTGGGAAAGT
25371		AATAGGCCAG	TTCAGATACG	CCGGCCCAGG	TECTATACCE	Atcourage and the second of th
25381			CTGACGGGTT	TTCACTGGCT	TTGATACTTT	TCCTTCAACA
25441	TTATTCAACG	CCOGGTTGAC	ATATAACTGA	ATGCTGGCAA	TGGC7TCTGC	CACACGGGTG
25501	GTTTTCACTT	GGGCAGAAAC	TTGGTTATCA	ATCAGCAGAT	AGCTUTACAA	CTEATCECGG
25561	CTCTTAATCT	GTTGAGGTGC	ACCATITITE	DAKTOKTOTA	CACTGGCCGC	TGTCGTCGTG
25621	GCTTCATCCA	GCCATGCCTG	AAGCTGGTCG	GATTGTTGAC	TGTTUAGTCC	CGCCTGCAAC
25681	AMAGTACTGG	CGGCTTGCCA	ATCATCAAAT	GITGGEATCG	GGGTTTCDGG	TTCACCGACA
25741	TATTTTAATT	TTATGAGTUC	AGCARCACCA	TUTCCAGTTG	TACCCAATGT	AGCAGCGACA
25801 25861	ACCEGTCTET	TOTAL PROPERTY	ANCIAIAAGI CTCTCNCSAC	TELLOCAGILO	O IMAMGG IAT	200010200000
25921	AATTGTTÇĞĞ	CARTGETT	TOTAL SCREEN	CASSICATION	TARKET LEAVE	TERRETARES
25981	TCACAACGCA	TGATEACAGC	ATGGAAGCGG	GTEAGCGCTT	ODDITEM AND STREET	CAGATTATCT
26041	TECAGTECTS	TGGTTTCTGA	TIGGAATITE	TCCGGTTTTG	TCACCAACAG	GGTCARTTC
26101	TTTTCGCTGA	GTCCAATATT	GCGCACAATC	AGAGAAAGTT	CCCCCAGTAC	CTGACAAAAA
26161	GCCACCATGT	TGCTGGTTTC	ATTCTCTGAG	CGATCACGGT	TAGCCGCAAT	AATEATGAAA
26221	TCATCGAATG	TCAGTCCTTG	TECTTTTATC	TGATTAATCC	ACAGCAAAAT	AGTTTCTGCT
262 81	GTTTTGGCTG	AATÇÇATTTÇ	AATUCTUUCA	GCAATCAGCG	GGGCAGCTGC	ACGGATCAGT
26341	TCGTCATCAC	CGAGTGAAAG	TGTTGATAAT	CCATTACTTA	GTGTCGTGAT	AAGGTTTTCA
26401	ATATCCGGCG	TARGGACAGT	GCTGTAATTA	TUUGTGGTCA	TCAGAAACAC	ATCACTGACA
26461	GACCATITCT	CACABARAÇE GACABARAÇE	CCALTGGGTG	LATTUGARCA OTOTHORORO	GAAAGCTGAT	TAATTGEGTT
26521	AATSCTGTAT	LAGNARMARG	GOUNAL LITE	GIGITCALAT	aggag aa ac	CGACAACAAC

				1 D4 H4 B4 nos		
26581	ATGGATAATT	CATTCACTGT	CAGAZGATUA	ATGTCTGCCA	GEAGACGAAC	GCGATAAAGC
26641	AGAGACAGGT	TCTCGATGGA	ACACATAAAT	TCTGGATTTG	TICCCCCATI	AGCCAGTTTC
26701	Caraarerer	ACAGTTCAGT	atcattcact	CTGAAARCAC	GITTCATTAT	TUUCABATAA
	CHIMAIGIAI	TTGATTCACC	OCCUPANT AND	TOCACO		ACAR BACTER
26761	AAATGGTTTT	TIGATILACE	GGGGGGTAAA	1000011100	INTINICAGE	MUNICICI
26821	TGGCCATTTA	ATAGCGGTGT	ATTGAACAGE	ATTGTAAAAT	GACTOGGITG	TIGITIAGIG
26881	CANTATTOCC	TGATATCTGA	ATGACACAAT	ACCAGCGCAT	CGCTGACGCT	ARTATTATAG
		AATATTGAAC	BTABBBCBCC	TEACHENDACA	Sales of the Party	A A TYC COTYPIN N CA
26941	AGCIRCATAL.	AATATTGAAC	ATMOORTAGE	* TACCOMAGN	PWIIGCIGIC	WILDGITAND
27002	TCATCATAAA	TACTITCIAT	TACTIGCUAG	ATATCTTCTG	CAGATATGEC	TGTGG CTTIM
27061	ተክሮኒክልሮርኒክ	TOGCTTTATT	CAGCTTTAAC	AGGAATATAT	CACCGGGAAC	TCCATCATTT
_		ATTGGCATIG	A TO BUTCHE	ል ሮርርር አጥጥ ነተጋር	TOTALOTOGCO	SADE/YEAR
27121	TAMAGIGIGE	WITCHCAILE	MINGERICCG	SCHOOLITICA	*************	************
27181	TGTTATACCG	TEGGTGATTI	GCICIGICGI	CANTI LAWIE	GRANIACIOS	MATURGUATI
27241	AGCAATGGGG	ACGAAATTTT	TATCTTGGTA	TATATATICT	TTATCTCCAT	TCTGGAGAGG
27301	DAK"YTBEEC	TGGTCAGGTT	TATATATATATA	TACACTGAAA	TTATATTTGT	ATTCATTTC
	ALDERIC CORP.	ATTAGCTCTG	Cheraconton a	NWTWC SERVE	THE CAN STOTE	THE CYCLE PROPERTY:
27361	TILBATICKA	ATTAGCICIG	CAIMSTITAG	7301070170	TATAL TOTAL	1000001100
27421	CTTAATCAAT	CTTGCCGTTG	CCGTATCATT	CCCGICATIG	ACCAATGTTA	TOAGTIGGTO
27461	ATTETTATAC	TGTTGATTTG	TATTTTTTT	ACCGAAGGAG	AGATTGACAA	ATAAACTGAG
	EBONEC STON	GACAAATCGT	DOTACOCAGO	CDSACSACA	A STATISTICS TO SET	ስልውም/ጌርምውር የ
27541) I CA J CA J AA	GHCARAICEI	AGINGCONDC		THE STATE OF THE S	
27601	ATCATCTGTA	COGAAATTIT	TETTCATCAG	TICIGITIGAA	TITTCCGGTG	TAATITCTIC
27661	TACAAGGATT	TGATACAATT	CAGGCGATAT	ATCAGTCTTA	ATAGCCAGTA	GCGATGTTGG -
	CTYCENTEDATE	TCCGCTACGT	CONCRETE TOTAL P.C.	COTABATECE	GTGAGGTTTT	ፐልምሮሞሞስርሮልል
2772)	GICCAITAGE	TGACGGGCTG	PARKET BY ALA	*************************************	COTOMONTON	DECIMENCO CONTRACTOR
27781	TARARTIGCC	TGACEGGCIG	METCATACGG	LAGAZGAZAG	GOIGICAIGC	F301110CCG
27843	GTAAGTGGAC	AACATTTTCA	Liyevecelli	ATACTCACTT	TTCTCTAACG	TUTGAATATT
27901	አጥርር እርር አር ጥ	AATTCATTAG	ATANGGATAA	TGTGGAAATT	TCTTCATCCA	TATTATTCTG
	CCTONGTCCC	AGTGAAGCAA	THE THE PROPERTY OF THE	باللماء وللملماء	አረርርማር፤ አጥልጣጥ	ChCharman
27961	TOTCMGTGCC	AUTOMASCAN	101000000	TOOTIONS -		CONTRACTOR
28021	aggatgaaaa	TCTTTCGCTT	CCEGATATAA	TILIGITARA	IMMOLLUCI	G ICHAMATAT
28081	GGAAGCAATT	GATCCCGGTT	TTACAAAACG	GTGGGGGGGG	CCATAAAACC	AACTGTTGTA
28141	W. Carlo D. Charles Land	AGGGTTGACG	GTGTAATATT	AAGGTTAGTG	ATATTAGCCA	GITGTGGATT
	**************************************	AAAATGOGCA	CHT/CTTCN AC	المنظم والمهادي والملحلة	ALL ALL PARTY CALL	CANCECCONS
26201	AGCACGGGAC	MANATOCOLM	GIICIICAAG	1114110103	1113411001	GAIGNUCEIG
28261	TTGATATAAA	AAGTETETTT	CTCGCCACGT	CAGAGTTCCA	CITGTCCTAT	GACGAAATTC
28321	CCTCLARGAC	ATAAACGAAA	TGTTTGTCAA	TAATAAAGTA	TCACCAGCCT	TITICIATTI
		ACAGTTCATT	ANCTITUTATO	<u>ኒምክጥልክ</u> ኒምሶሶ	ተተከል አለያጥምል ተተ ተ	ርተተል አ ግግግል ል
28381	MICLIMICIA	ACAGIJU(11	ANCILLIANCE.	WINTHOOM A	AMBAMBAMBAT	
28441	TGATTAATGG	ETDEATTITT	GAGATIATIA	TANICIONIN	CONTINUE 181	GGTTAATTAA
28501	ATTGATACTG	ATTIATCECT	CLYLLLLLL	AATAAAAAAT	AAAGAACTTE	CCTATAATAC
28561	TOTAL STATE OF	ATAADTAATA	CCCTATGTTA	AAAATTAAAT	TTTAACAAAC	TTTCATGAAA
	A 199MIIIA	CAACAATIGT	THE REPORT OF THE	TYPE A THE YEAR A THE	للمداركولها فالملكوليفنا	TYCHRESATYES
28€21	AAATICAACI	CHACHALLO	TIMMMINITI	75447110107	73010410-1	TONNAME TON
28981	ATGACTAATA	TITATCTATE	AAAGATTATT	TATIGAGGAT	GUCTIGETIE	GTTTCAGGGG
28741	GCTACGTTGG	AGTCAGATAA	ATGTGTGCAA	AAAGAAATCC	TTAATAAAGT	TGCGTAATTA
	CARABOTTEC	TATATCGTGA	CARGAGTGAT	AUTOMATUR	TATETAKTAN	TELATACTES
58601	CAMBONITION	INIMICOION		TARTER ARCH	ひたりとごごでもつで	*****
28861	AACCTCGCAA	ATGCGGGGTT	TITUTIUGUA	THAT CAMEN	RAWHOLTHIO	ARAMARIAC
28921	TGATTACTET	TATTCTCAGT	ACCCTTTCTT	TICCICCITY	GGCACAGEAG	GGTGGCTTCG
28961		CAGCACAGAC	ምልጥት ስተስት ልር ደር	CTCCATITAL	AGGTCCAACT	CCCAACCTGA
	ITTECCCOM	TCAAGCAAAA		*****	Charles Aleksandre	CHACCEDOCK
29041	CCAGCGTYGC	TORRIGORARA	ACITITOR	HIGH/GCG/G	QQ11Q11C1G	
29101	TTGTTAAACA	GGTTGGTCAC	GAACTCTATG	AATTCGCGGC	CGCATAATAC	GACTUACTAT
29161	ಕಿರೆಡಿಡಿಕೆ ಸಂಗಡಿಗಳು ಕರ್ನಡಿಕೆ	TATTACGGAC	TTATCCGGAA	AGETATETGG	AACCCCTGTT	ACGCCTGAAT
	********	TCAGGGATAA	CACTACATACA	CHALL MARIANS	ACATTGATGA	TRACTECTES
39221	WWW.HCHCKWI	1CH33GAIAA	CHOICOTICE	COMPRESS TO STATE OF THE STATE	A A 内の内できませい	COLCINICAC
29281	ATGGGTCTGA	CGGCCACTCC	ARCIGNORMA	GIACOTATEG	WHITE I LIMMES I	GARLAMAIN.
29341	TGGAACAGTG	TTGAAATTGA	TETCAAAACT	ATCCGCATAG	TGAAATAACT	CAAGCACTTT
29401	GRETRITAGEC	CCCCACTCGC	CACCOTTTTT	GCTTTCTGGG	AGTCGGAAGT	TTARCEGTAG
	man acreate	CARACTARG	THE PARTY OF THE P	TOTAL STATES	TATIONSTATE	AACTTATCAN
29461	TGRUGAGGAT	CARRACINAG	1 TANGGOGGRA	1001 LAC 13A	TITESTOCK!	WATTATOW
29521	AACTTAAAAA	TCAAAACTTA	TTTTTTATTT	AATAGAGGAA	TETCALCUIG	TAGGTGAATA
29581	POSTERNAMOS	TATAAATAT	ACAGTATYAT	AGTCCTT7GA	TATGTTATTA	AATTGAAAAA
	C	ATATTCGGGG	ታት እስጥተው ምም ል	PACTIC BOX PROT	ፕሮ ርድ እውደ ተሞ	B TTD & TYPETY
29641	CUTTYMARCT	A1A11LGG3G	GARATISTIS	1010-004-01	************	37123 MM 4757
29701	atarcaatit	TGGTTGTGAA	TATAAAGUSS	ALLIETITAA	WINNELLI II	ATRATIGICA
29761	TACACCCATT	TTTCTCATCC	CCGGTTTTTG	CTGTTGTAAG	GAAGCGGTTT	CCATGAAGAT
29821	delate to secon	TTAAGCAACT	GCCACATAAA	TTGGCLGCAG	TEGTTTCCTC	<u>የሮ</u> ኒሮርርያንንንር
	11100/2010/2	TOTAL CARREST	ON CONTRACTOR OF THE PARTY OF T	STORES AND A	ウククウルスできるの	TVVVVVV > > > > > > > > > > > > > > > >
29891	ATGCAAGGAT	TGCCATAGAC	PATCHALLIAT.	ATTEMACUIC	THE PART AND THE	TOO TANKE
29941	GAGAAGATTA	AATTTGGGAT	LC111GCCVC	CCAAACCCCTG	ACCTTCCGGC	TCITATGAAT
30001	CCASTACTES	TCTAAAATTA	ACCTGATGGT	TT7GGCATTA	ACATATTGAT	TGTTAATTTC
	**************************************	TTGATAAATA	P. D. Grander & Colored.	ب و و بهران العلمان	<u>ሰሞአምሮው</u> ኔሮኔም	አስርሚያኒካ ማግግም
30061	ATUTAACAAT	TIGATAAAAA	TISHORETI	CONTRACT PROPERTY.	# 4 \P \P \C	ANGIONIII.
30121	TITCGTTIC	GCCTTGAGGC	AATTGGCAAG	GIAGIGITIT	TGGTTCTTTC	CHUCGGTAAC
30181	TPLTACELLA.	TGTTGCCCTT	TGAAGCACCA	GTCTGCACCG	ATTYTOGGGT	TCAGGTTGAT
	THE CAMPACE	TCCTCATAGA	ACDOCCCCCC	الإشارية المالية	GGC ATTYCO TO	ABCGTCTCCC
30241	GTOCACCTCA	TOUTGATAGA	MONUTOR A	220001 Annual -		4444444444
30301	TGATTTTTGC	CATTITTICA	TENTACTOAG		TTTTACGGTT	GGTGCCGCCC
30361	TICCCCAAAC	GATGCCCGTC	CGGCAAAAGT	agegatagag	ogtactitga.	GAGAGCGATG



30421	TATTCAGTAG	CTCATTGATT	TIAAGTGTAA	TAAGCTCAAG	GCTCCATCGT	GAACGGAGAT
30481	agccaaaatg	TIGIGGEGAG	TGCTGTAATA	. AGAAAGAAAT	GACTGTGAAG	AGCGGAGCTA
30541	AGTTCCAGAT	' GGCAGGCCTI	' CCCGCCGGGA	GGCTTTTAAG	TOCTTECARO	CCGTATAATG
30601	TTAACCAATT	'TACCCAACGA	TGAACGUAAG	ARCGTGARCA	GTGAAGCGTT	CTGGRAACGT
30661	Garaaccot	' ACTCCCTTCA	TGTAACATCA	AGAGEGEGET	GARGCGACGT	GCATAGTCCT
30721	TATCCCGGGT	TTTCTGGATA	. GCTTTTTTCA	TCCGACGTCG	TTCATTTOGG	GGTATTGATG
30781	TTATGATTGG	CATGACTCAG	TCCATTTTGG	GATTIGITIT	GATTTGGCGA	TTAATCAGAT
30841	CGCGAAAATC	ĠĠŖĊŢĠŖĠŢŢ	CCCTTCAAGT	GATCTACTAT	TTTGAAATUT	TATTTAATCA
30901	GGAGTCAGCA	AATGAGTTAT	TCCCCATAAT	ACCTGACCAT	GTGGTTGTTT	ATCCCGGGGAAA
30961	TGATTCATCT	accesteta	TGTGGATTCC	TIGGIGCGAT	AGTCAGAAAG	ATATTGACTE
32021	TGGECATTAT		CTTTCAGTAA		GCTGATATTG	TOARCTACAT
31081	GTTTCAACAT	GGCAGTTATG	TITATTITAC	AGACAGTAGT	AAACAATTTA	GEARTRAGEA
31141	AATTATGTCT	GGTGATTCAG	CTAARGGEAA	AGGGGATTAT	AAUCTTCAAN	TTAAAACARA
31201	CGGGAACCTT	CCACTGATGG	TATTGAATAA	ATATTGATTC	ATTATTATTT	ATGGATAAGA
31261	AATTAAGITT	ATATTTCATE	TGGTTTCTGC	AATTAAGTTT	TAAAAATTAA	TICTACTITI
31321	TITATGGTTT	TATATTTART	GCCAATCATA	TIRTITITE	TATAATAATT	GATAGTTTAT
31381	TTATATAGTA	AATAAATTCT	GTTGGATGTG	ATTATTATTG	TGAGACGGTA	ATAATTAACA
31441	TAACAGAAAA	TTCATGGTTA	GGAAATTÇAJ.	TCAACTTTTG	TCCGGTTTCC	TGACCATGAA
31501	GACCTGTATT	TACTGTAGAA	CTCGCATTGA	TACTGGATTG	ATTAGCCCGA	CONCRETENCE
31561	GTCAGCAGAT	AATATGTTGT	ATATTGGCTG	TGGATTTTTC	AGCGAGATGA	TACCTOTICS
31621	AGTAAAGGCG	ATTRATARCC	GATAAAACAG	AGAGACGGAT	TETEGCCAGG	AMBECABLA
31681	AGCETEACEA	TGACGCGTTA	TTCAAACATT	TTTTAACCCA	ACCAGAAACC	CCCCCCAAT
31741	TITTATCCCT	TTATCTGCCG	GARGEGATOR	GGTCAGTGTG	TGATTTACCA	CACTRAGACT
31801	GGAACCGGCA	GCTTTGTGGA	CAGGCAATTA	COTCAGTTGC	ACAGTGATGT	CONCRETE
31861	GTCGAGACAA	CCCACGGGGA	CGGTTACATT	TATTCCCTGA	TTGAACACCA	GTCCACGCCT
31921	GATCCGTTAA	TEGCCTGGCG	GCTGATGTAT	TATTCGCTGT	CARCCATGGC	TGCGCATCTG
31981	AAAAAAGGAC	ATACTGAACT	CCCTTTGGTC	GTCCCCCTGC	TGTTTTATCA	TGGTGAGGTE
32041	AGGECTTACC	CTTACTCAAA	TUGATGGCTG	GATTGTTTTA	CACTUTURA	ACAPGOGGETT
32101	CACCTGTATA	ATCAGCCCCT	GCCGTTGGTG	BATATCAGTG	CGCTCAGTGA	TEADAGAGTE
32161	CTGACACATA	ARAGEATTGE	CTTGATGGAG	CTGGTACAAA	AACATATOOG	THEFTEREST
32221			ATTEGTGGCG	TIGITGAATG	CCGGTTATAA	TAGEGEGEGA
32281			CTATATTTTA	CTGAATGGAC	ATACGCTGGA	THOUSEPPA
32341		AACTGACTGA			CCATGTTGAT	
32401			GCGTGAGCAA	GREERGACAG	AAGGCAGAAC	ACAACCCACA
32461		GGGAAGAAGG		909090909	CATTATTACE	COMPARED
32521	AGTCTGGACA				AGAAAATTGA	
32521				ATATRGTGAC	CCCTGTGAGG	CCSCCCOD b S
32641		CTACGATTTA	CGACGGGTTA	COTAGGAAG	CTGAATGAGA	CCACCCCCC
32701		TCCCATATCA		TICCCCCTAC	AGCTARCTAN	
32761			AGGCCATCAT	COTSATOROC	7GACCAAGAG	PACHACOLOGIC
32821			TAAATTCCCT	TATIONALOUS	ACTOCCOCCOCC	CANACTOCOC
32861	AAATECAGTG	ACCACCGTCA	GCATTAAAGA	GTGCGTCAGE	CUCCCSDAMANC.	CACACACACACA
32941	CCAGTTCAAA			TTTCATATTC	CECATORT	TIGGTON
33001			GCACCITITI	CCATCGTGCC	CACTICATA	10011WITEW
33061	TATAGCGGCG		TCAGCACCCA	GACATGAACG	ጥርር ሲጥ <u>አረንሞ</u> ትል	CCSSSTCCS
33121			ACACCTTGTG	ACECTRANA	CCCCATACTIA	TO A TEMPORAL
33181	AGTAATCCAT	STECEGATEA	GGATTGGGCG	GAGGAGGGTT	ATOSCOCTO	ያነት የማምረት ሞት ተም
33241	TEGGGGGGATA	CAGGITAGIA	TGGTGACCGA	TGTATTETGC	CCAACCGGTA	CCDARGARGE
33301	DGTAGGTCAT	CACAAAGATA	TIGICTAAAT	AAGGTGCGAT		CONTRACTOR CONTRACTOR
33361	CCATTTTGGC	AACGACGGCG	CTACAGGCTA	TOGTOSTTT	ስተስተያ (ሀርክርክርክር) እ አ ተ ተ ተ ተ መንወታው	CACAGO CATOL
33421	AGGCGATGTT	CAGTGETTEA	CGCAGCTCTT	TONOTONIO	A A CATA CTTT	COURT I HUMB
33481	GTTCCGGGTC	GARTTCATTA	CCTTCTTCAC	CHETECHER	CCCCTITIOTT	C8CTCC8TX
33541	CCACCGCAGT	ADDOMESIA	AAAAGCOGGG	AAGAAGTOCA	CONTRACTOR C	ロリムシアア (MAG MA) マイ・アイ・アイ・アイ・アイ・アイ・アイ・アイ・アイ・アイ・アイ・アイ・アイ・アイ
33601	GCACGTTGCT	CAGGATCTTT	GGCCATCACA	GAGADOTECO		pesentates enemantes
33661	ATACTGAATG	CGAGTTCCAG	CTTATGCCCT	CCCACALANT.	CIGNERINE	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
33721	AATCCCCCA	GTAAACCGGA	GGCTGCATCC	TGATTETALT	ATTTCTARGALI	Pathethurce Pathitum
33781	CTGGCATCAC	GGGGCTGATC	DGCGTFCAGA		へっていったれるかだれ にかだかたたかかかった	TAR A STOCK COOK
33B41	TAAGGATCAA	CGGGTACAAT	ATGGCCTEAT	CTAATACCCC	ርያያ ፈረፈፈረ ረው 2191021 0 66	ACTOR TORSELLA ROTTOR TORSELLA
33901	TCTGCTTGCC	GGTTCCACCC	GTCAACAACC	TCATTABTOC	ርብሔሌ/ርር/ንስታያ የ ምንዓን የ ም 1/2/2/ምር	Metallian Comment
33961	TCACCGTTGA	CGGCCATAAA	AUTGAAAATC	AGGCGGTCGT	PERCEALING ATTOOMING	~~10061110
34021	TCCAGATCAA	PYCCTUCACC	CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC	ብርርርርርርርር ተመጀመሪያ ነውን ፣	CCCCSCALACE NGOCOGIANCE	
34021 34021	TOTGGCGACA	LACCHCCCATIC	PARTAGENEOUS CO	ት ት ቀም የ ለው የ ተ ተ ቀም የ ለው የ ተ ተ ቀም የ ለው የ ነገር	~~ ~~~~~~ ~~~~~~~~~~	aluciuggtt Alaman
34141	AGCGGTTCTG	And Laboratory of the Control of the	ATELACTOCAC	Table Care 1 WY .	ን የሚያስፈር የተመረሰ ነ	GACTTTAGGC
34201	GCTGAAGAAT	PPCALIFY AND THE STATE OF THE S	VICTORIAN CALC	ስርርርርርርርርርርርርርርርርርርርርርርርርርርርርርርርርርርርር	ŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢ	いいしんれんさんびご
WI	CCIONNUMII		W1146GC1G		THINK COUNTY	CITCIGATAG



34261	GITTCITCIG	TGAGTGCATC	ATATTECAAT	ACCICGGIII	TITCTCCCGO	OGGTACATCA
34321	GGCGTATTGG	GGTTACCGTG	ATCGGCAATT	TCTTCCGGTG	TOGCCTCACO	GACATATIGC
34381	CAGGCATTCT	CATALACCES	TAAATCAGGT	GAAATATTGC	GGTCGGUAAT	ATGCCAGCGT
34441	TURNETCARE	CGATGTTITT	AAAAACCGCG	CTATCATAAA	TGACATACCA	GGTTTGACCA
		TCTGCCAGGC	naccacae T	CCCCCTACTT	יו מי מי אורי ויידור אין דין ויי	GTCAGACATC
34501	CCAGATTGAT	AAGGGTATCG	THE RESIDENCE	TENERCATION		CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
34561	GCTTTAATTG	AAGGGTATTG	ATARACATTT	TOMORCK ING		GGCCCCGTTR
34621	TATTCCGGGG	COGGCTCCTG	ATATCAGTTA	GARTIGICTI	GTTTTAATTG	ATGITTATIC
34681	AGAÇGĞCTAC	GAACCTGCTG	GCTGAACTCA	TIACTICOGC	CACTCACATC	ACGCGCGGTA
34741	TARCGUAGAT	GGAGGATAAT	ATCCCTCAGC	GACTCCAGCA	GCIGATCCTG	atcggaaccg
34801	ኔ B ማጥሮሮ L ኤሮጥ	TCCACTGTGA	AATGGCGCCT	GTCCCTTCAA	AAGGCAGGAA	ABGITTCATCA
	POST I COMPANY	GCCTGAACAT	CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC	TECATGGCCG	TTGAAATCAC	CACACCCCCCA
34861	TCUMMITION	CGTTCAGCAA	A A CONTINUE OF	COTTON	STTYCE AGES	CATANCALA
34921	TIRGUCTUTA	CGTTCMGCAG	WITCHTTTTT	TARRECTAT	TTTCCANOUS	WAR DARWING AND
34981	TAATCEATAG	TITTTAAGTC	AGUAGTACIG	INNAUCTAINI	1961086116	TWO CAR TOWA
35041	GCCCGTACAT	CTTCATAAGG	CCCCAGCAAT	GOGGGGARTG	ALAGUGUTAC	GGTTTTTATA
35101	CCCCGATCAG	CGTGGGTCGG	ATAATCGCGC	AAGAACATTT	COUCGCTCAG	TAAGAAAGTG
35161	AATGAACCCG	TACTCTTGCC	AATTTCCCAC	TGTGATGATG	TCAGTAATGA	TTTTACCGAT
35221	እጥ ር ያተሞሞሞች	TGATCTCCAG	ACGTCTGGTG	TTATGTTGCA	AATACGCCTG	ATCCATCCGT
	ማርማኢአድርሮፒኒ	ATTTCAGATG	TTCTCCCACC	AGGARGEECT	GATAAAGATC	ATTOCAGAGA
35281	10270050010	CGAAATICAT	እመመከጥከር ፕሮስ	CCMATALALCGA.	DOTTOCOACCA	COMPTO COLOR
35341	ECRETTIVEA	FORMALI TONI	WATER TON		A TO COLOR	ACTION C
35401	agtaaacaga	GGGAATTAAC	CUCATUATAG		ACAMOU LOUMS	ATTIGGCIGA
35461	TCATTEACAT	GTATAACGCA	TCATTGGTAN	ANTIGTIUNN	имимимимим	MINNINNIN
35521	CCGAAGCATA	CCGCCAAGAC	CATCCCCCCC	ACGGCCAGAC	CGAAAATATT	GGGAACÇATA
35581	TOCGCORDAG	CGGCCGCAGT	GGCGGCTGAC	TEGGEAGCGA	TCACACCTTC	ASCCCCTCTT
	CONTRACTOR ATTE	CGATAACTTC	CTCCTOGGTG	ATGGAGATGT	TITCATCATA	GAGCGATTTA
35643	- ACCOUNTED	GGCGCTCCTG	ACCCCCCCCCC	CONTRACTOR AND A	TOMOTHOUSE	ርስ አጥር አልሮርት
35701	TAGLGIIGGI	CAATOGCTTG	00000000000000000000000000000000000000	TOUR CONTRACTOR	ACCORDONACAC.	CCCOVOLENCE
35761	TGTTGCATGT	CARIOCTIC	CIGIIGEMEN	1100000146	MOCTOTACIÓ	
35821	TGCTGCATAC	GGAAGTGTTC	AAAATOGGTA	1.163.61.1.1.1.1.	2 CILCAGLAR	ACTUAGTAAC
35881	GTGCTGCCGT	ACTGAATCAG	CCITTCTGCG	GCCTCTTTTG	CCCGGCTCAT	GATCGGGGTG
35941	AAACGATAAT	TCGGGATTGC	CCCGCGTTTC	ATECCCGCCA	TACGATTAGC	CACAACACGC
360D1	TOTAL ACCOM	GCCTGAGCAG	ATCTTGCGGG	CTGATGGGTT	CATCGTATAA	TCCGGCCGGA
	A CONTRACTOR C	CATCCAAGGT	<u>ሮእሮርሞተ</u> ኔፕሮ <i>ኔ</i>	TATERAGERRY	ATAGACGCTG	እየምርኔእሮኔ የተ
36061	AACTC / ITAL	TGAGATATTC	COUNTYING	CONTINUENCES	ስጥአስአጥሮአርል	COCTOCOCOCA
36121	TGCCACAGTI	TUAGATATTE	COLATONICA	ACCOUNT OF COLUMN	A CONTRACTOR	NACCHECIACA
36181	GAGACGGATG	TATCATATGT	CACAGGCAGA	MC 100CLACG1	JOC TOWCHO!	ANGUATIANC
36261	TOTTETGCCC	GIGCTICACT	GTTTTCATAU	AGAGCCACAT	CTTGCAGGGT	ACGGGGTTGU
36301	CAGTTTGCCG	CGAGCAGAAT	ATCAGGGCTG	GTACCCAGTA	ACATATIGAC	GGAGTCATAG
36361	ATCTGCTTGG	CGACAGTACG	TGCACTGGAT	GTCAGCTTAC	OGTATTCCAT	GTCTCCCTGA
36421	ተምየት ክር ይርነውን	TCTTGACATA	GARACGGAAT	ATTGCTTTCC	GGTAGTGAAT	GGGTTCACTG
-	TATIVICATION	CATCCGGATC	COTTENTO	ATTRACATEC	GGTACACGGT	GGGTGGAGGA
36481	CC10CMH100	GCCGTGAATT	001100110	COMPTACCET	COTTGOTTGCC	CTCDACRACT
36541	TUARTHATIG	GOLGIGARII	CONDIANCE	SCAPERFORE	ACT LOCKORC	
3 6 601	TEATETTEUA	GCGGATTAAA	MATATAGIGE	MUCCAZICOS	1000001111	IMMICGIAGA
36661	TCTATATTCA	GTOGCCACGC	GACCAGAAAT	GGCATATGGA	AAAALAGSTU	CERGAAATAG
36721	ATCCCATTIG	CGCCATTTAA	ATCAATCGGC	GTAGGGAATG	AACCGGGTAT	AGGCTGTTCG
367B1	CTABTABCCT	GTGTATTCCA	GCTCAGTACC	TECGGGATAC	CCTGACTGGC	AATGGCCATC
36841	P Collaboration ()	CAAACAGTGT	ATTANGERGA	ATGTTTTGTG	GCGCGTTATC	AGTITCATET
	MOTITITIO	AAAGGAATTG	ሲያ ቤርብሊያ ይርሊ	TGTTCATTGA	CTTTARTCAG	TTOGGGAATA
36901	GOSGGSAMGS	TTCTGAACTC	CALCULATION TO CALC		CONTRACTOR ALC	F C C C C C C C C C C C C C C C C C C C
36961	TGCATACCGA	TTCTGAACTC	TIGHGIACAG	LIGGEACTIT	COLLAGORACE	WORKET 1110
37021	GGCTTAAAGA	GAAGTTCGGC	777CAGGGGTG	ATTOURNANT	CCGRCCCCAG	CITGATION
37081	GGATAGGTTA	AATCAAGAAC	TITITEGETE	AGTACCAGTG	GHIGHTCATC	Caagacagta
37141	TTATCGTGCA	TCAGCCGGAA	AGAACCGTTG	TAATATTGAT	GATCTTCTAT	CGCACCAAAC
37201	<u>ተሞል ል ልርጥሮ ልር</u>	ATTGABCGAC	AATETÉÉAĞŤ	GTGTCATCAG	TGCCATGAAC	AAAATTGACA
	TIESTANDS AND	TACTGTCTTT	COCCADATOA	CECUTYCATTC	COCCUTTOCCAT	TOTOCCCCAA
37261	RICAGILIGA	TTCTTCCCGG	CONTRACTOR OF THE PROPERTY OF	ACRECACEAT	BOTTO COCCUEBB	でごうながりにごうか
37321	TAGGARAGOS	CATCCTTGTG	CATACCOCCA	maken and an a		TO CONTACTOR
37361	TGCCTTAAGG	CATCCTIUTU	Tracelead	INMINCURGA	COMPOSITOR	GA-CALARIALIA
37441	CCTTTTCGTC	CATCAGCATA	TIGGTERICE	GGUAAATCAG	TAATTICIAC	CAGCAGTGTA
37501	TCGCAGACAT	AACCGAAGGC	TYRGYEATAA	TCATAATCCT	TACCTTTCTT	ATLYGTCCCC
37561	TWINDGARGGA	CARACGGRAC	Cagageeaga	AACGGGTTAT	GCGGGTCTTG	CTSTATRICC
37621	<u>ልጥር እር ስርርር ክ</u> እ	CCATCTGGGC	CATCOGGTAT	TOCAGATORE	TTCGCGCAGA	ATGGTGGGTG
	THE PROPERTY OF THE PARTY OF TH	GCCATCATAT	TOTAL	CGATTITGAT	ASSAUTESON	ACCUTATION
37681	IMCICCAGUI	TCACCCGCAC	SIGGERIANO	Color of the Color	TECHOTOSTA	PUCCE STATE
37741	AGGAACUCAA	TORRUGUE CALC	ANGGLIGHNU	WANTED THE	TOPOGRAPH STATE	~^~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
37801	ATCTTTAGTT	TCAGACTGTT	CITCAACTIC	CGTCCAGGCA	ATATACAGGC	GATTATTCAG
37861	DDDDTAAAA	CGTATCAAAT	JGGGGTEJAC	GCTGCCCAAT	GUCAGGTCAA	TAGGTTTÇÇA
37921	CTESCTCCAG	GCATTGGGAG	ATAACGEATC	GGTATCAGGA	TEGESTATES	AAAGATTCAS
37981	TODA MODERATE	ጥልልቸልተቸርርጥ	ATRICTOTOT	ACGGGTACGT	CCGACAAAGA	AGAACTTATC
38042	CLEALING DAY	TZNACACCAT	CTTCATAACC	TGCGATAACT	TTCAGGTTAC	TGACATCTTC
~254 F	acailion.			·-·	,	



Fig.2.

38101	RARATTATTC	AGATAACCGA	GCACCGCTTG	TTGTACAGAA TTCTGTTTTA	TCTTCGGTAA	THE STREET
38161	ATTARGGGCA	CTITCCAGIT	UGAAUAAG AA	LIGITIES	T T PROPERTY	Mannada T t c
JOI 11	CAGATAGCTT	MACCONDINA AC	ランドイン・マススマスス	ር የሚኒኒ ሞር የርር		
28771	CAGATAGUTT		17 COT WHTW.	OPPLEA		

N=unspecified base

Fig.3.

